

# Service Innovation Methodologies I



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What can we learn from service innovation and new service  
development research?

Report no 1 from the TIPVIS-project

By

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## Abstract

This report presents a review of service innovation and service development literature. The main purpose of the review is to identify normative implications for service innovation methodologies. Three separate reviews are conducted and reported; an open search review based on specific search terms of relevance to service innovation methodologies, a review of articles in four of the most influential journals on service innovation/service development, and a review focusing contributions applying normative approaches and/or principles. Some of the main conclusions from the review support previous findings that the service innovation *process* is less formal and that it is more difficult to identify stage gate models than for product development processes. Human resources are revealed to be a particularly important *innovation condition*, but the importance of technology (and information technology in particular) seems to be increasing. Several *types of service innovations* are discussed. Also, the importance of innovation types as an influential factor moderating the effects of innovation conditions on innovation process and outcome is discussed. Finally, many measures of *innovation outcomes* are discussed. Very few contributions conclude with explicit implications for service innovation methodology. Much of the literature is based on industry specific case studies lacking in external validity. While the literature reviewed documents that service innovation differs from product innovation, little is said on how this could guide prescriptive service innovation methodology literature. Thus, further research transforming the descriptive findings on successful service innovation into prescriptive recommendations for service innovation methodology is required.

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# 1 Introduction

Recent years, the term “new service development” (NSD) has been used as a service industry term equivalent to “new product development” (NPD) for manufacturing industries. Searching Google for two very similar expressions extended from these terms, however, provides very different results. Whereas a search for “new *product* development methodology” provides 965 results, a search for “new *service* development methodology” provides no hits at all. This reflects more than just differences in the maturity or practical use of two different terms. Whereas the Product Development & Management Association (PDMA) offers a large handbook and two toolbooks on new product development, no corresponding organization has been established for new service development. One could argue, however, that new service development practices should be covered by PDMA, but of the 625 pages of the PDMA Handbook (Kahn, 2005), only 16 is devoted to new service development.

An argument that would make it easier to accept the above identified situation is that NSD and NPD are not all that different and that most of what is known of NPD also applies to NSD. Service researchers, however, have used hundreds of academic papers to argue that services differ from goods in distinct ways. Of the characteristics most often used to differentiate services from traditional products are intangibility, heterogeneity, inseparability and perishability (Zeithaml, Parasuraman and Berry, 1985). Whereas researchers generally agree that these characteristics are typical for services, they do not agree to the same extent in how to categorize different services or service activities. For example, Cook, Goh and Chung (1999) identified 39 different typologies of services with variation in empirical support. It is also likely to assume that because services are different, innovation activities will also vary across services. For example, in the Norwegian version of the Community Innovation Survey (CIS-4) it was found that the second most innovative industry was the “Computing and related activities” (NACE Code 72) and the least innovative was “Land transport; transport via pipelines” (NACE Code 60). This also makes us assume that innovation methodologies, including what may be suggested as optimal methodologies, are likely to vary considerably across services.

Several approaches may be applied to help overcoming the situation of lacking service innovation methodologies. One approach is to systematically review and apply what is known from empirical studies of service innovation to see how this applies to service innovation methodologies. Another way is to review the NPD methodology literature to see how it applies to what we know of services. This approach, however, requires an understanding of previous attempts to develop and apply NSD methodologies as suggested by the first approach. A third approach would be to discard all existing NSD and NPD methodology literature altogether and start developing new service innovation methodologies from the ground up. This approach, however, seems unnecessarily radical and rejects the hypothesis that relevant NSD methodologies exist in the NSD literature and suggests that NPD methodologies are inappropriate for all types of service innovations. In this report, the first approach is applied. In a follow up report, however, we will apply the second of the two approaches.

## **1.1 Problem**

As presented in the introduction, services are believed to be characterized by intangibility, heterogeneity, inseparability and perishability (Zeithaml, Parasuraman and Berry, 1985), and sometimes by their information or knowledge intensity (Miles, 2004). It is expected that these characteristics make service innovation different from product innovation. For example, service innovation is believed to be more incremental and less radical than traditional product innovation (Johne and Storey, 1998). It is also suggested to be less driven by technology (Cooper and de Brentani, 1991) and to a lesser extent be based on R&D (Brouwer, 1997). De Brentani has suggested that service innovations are easier to copy and more difficult to protect (De Brentani, 1991). Some of these suggestions are also confirmed by empirical studies of service innovations (Tether, 2004). Tether (2003) suggests the following hypotheses on service innovations. Most of these hypotheses are also, at least partially, supported by empirical findings:

- It is more difficult to separate product, process and organizational innovations for services.
- Service innovations are more often organizational innovations
- Service innovations do more often have qualitative and less easily measurable effects

Studies of the service innovation process also suggest that the process is less formal than in traditional product innovation and that it is more difficult to identify the



discrete stages in a stage gate process model of the type applied in NPD (DeJong et al., 2003). While the characteristics of the service innovation process identified above are related to innovation processes, drivers, types and results, it is also likely that the applied methodologies, tools and techniques of service innovation differ from those of NPD. Very few studies, however, have been conducted focusing methodologies, tools and techniques in new service development and service innovation. This is not unique to service innovation, because traditional *descriptive* NPD literature is also more focused on innovation drivers, processes, types and results than on methodologies, tools and techniques (Menor, Tatikonda and Sampson, 2002). Methodologies, tools and techniques have instead been focused particularly in the prescriptive product innovation literature (e.g. Kahn, 2005; Belliveau, Griffin and Somermeyer, 2002; Belliveau, Griffin and Somermeyer, 2004). As shown above, however, prescriptive service innovation literature is almost non-existent, at least when seen from an academic perspective.

This situation makes it natural to raise several interesting questions. One is if the reason why we find less prescriptive service innovation literature is that service innovation is more difficult to formalize or if the formalization of service innovation processes has negative effects on service innovation results. Another question is if it is the more customer driven and less research and technology driven innovation processes of services that makes scientific and research based methodologies less relevant to service innovation. A related question is if the empirical findings from descriptive studies may be transformed into prescriptive methodologies, tools and techniques. Also related is how the empirical findings from descriptive studies may be transferred into prescriptive guidelines if not by applying scientific methods. As a basis for further exploration of these research questions a review of the more prescriptively oriented literature on service innovation and new service development is required. As far as we know, no recent review of this kind exists. Through the literature review the following research questions will be focused:

- What is the status of the recent prescriptive literature on service innovation?
- What does the recent academic literature on service innovation say on prescriptively oriented service innovation tools, methodologies and techniques?
- Is it possible to derive prescriptive implications from the recent academic literature on service innovations?

As suggested above, the treatment of these research questions provides one of two potential approaches to developing prescriptive methodologies for service innovation. Another approach applies prescriptive NPD methodologies. This approach, however, will be treated in a later report of the same project.

## **1.2 Aims, approach and organization**

Good reviews of rather recent literature on service innovations are found (e.g. DeJong et al., 2003; DeJong and Vermeulen, 2003; Küpper, 2001), but are all broad reviews of service innovation seen from a descriptive perspective. They aim to summarize the status of what is currently known of service innovation drivers, processes, innovation types and results. However, they devote rather little attention to how this knowledge may be transformed into managerial implications at the level of the service innovation units or how it may be transformed into prescriptive methodologies, tools and techniques assisting service innovation at this level. The rather little attention that is paid to implications focuses policy implications for innovation system policy makers and future research.

The aim of this report is to provide a summary of the status of recent knowledge on service innovation as seen from a prescriptive point of view. Included is the aim to derive at guidelines for methodologies, tools and techniques supporting the stimulation of service innovation drivers, innovation processes, particular innovation types and particular innovation results. In addition, we also aim to summarize the prescriptive literature on service innovation that has recently been published. The final goal of providing this review is to enable the development of service innovation methodologies, tools and techniques that are particularly well suited for application in service industries and for general service activities at the firm or value network level.

Drejer (2004) and Coombs and Miles (2000) suggest three approaches are possible to understand service innovation. An assimilation approach suggests service innovation primarily may be described applying existing product innovation principles. A demarcation approach suggests service innovation is unique and that new principles must be developed for the sole purpose of describing and explaining service innovations. A synthesis approach suggests a combination of the two previous approaches is best suited for understanding both service and product innovation. One of the arguments for a synthesis approach is that most recent product innovations also include innovations in service activities and fewer and fewer innovations are pure

product innovations. The three approaches may also be transferred to prescriptive methodologies, tools and techniques. Thus, an assimilation approach suggests product innovation methodologies may be adapted to service innovations, a demarcation approach suggests all service innovation methodologies must be developed from ground up, whereas a synthesis approach suggests both types of innovations may benefit from a combination of the two previously applied approaches. In this report, a synthesis approach is applied. Thus, we focus our review of what has been published from a service innovation perspective, but the review is not limited to contributions originating in the service innovation or NSD literature only. To reflect this approach, several types of literature search have been made to identify relevant contributions stemming from both service innovation and product innovation literature. That said, we also suggest that service innovation methodologies may benefit from a more assimilation oriented approach where methodologies developed in the NPD literature is investigated and analyzed with respect to its potential for adaptation to NSD application.

Applying the synthesis approach for the rest of this study, the report is organized as follows. In section 2, we present the method applied in the review study, including the theoretical framework of DeJong et al (2003) which we apply to categorize contributions. In section 3 we present the contributions identified when applying two different literature identification methods. In section 4, we shift our focus from a descriptive and explanatory focus to a prescriptive focus and present implications for service innovation methodologies that may be derived from what we have reported in section 3. In section 4, we also summarize the results of a literature search for existing prescriptive service innovation literature. Finally, in section 5, we summarize our conclusions and discuss how to proceed further in developing successful service innovation methodologies.



## 2 Method and literature selection

In this chapter we present the theoretical model that has guided the literature review. First, we present the model and discuss the constructs included in the model. Second, we explore the procedure and the terms used for the literature review. Finally, we give a presentation of the characteristics of the literature used for the review.

### 2.1 Theoretical framework and relevant search terms

In the last few years, DeJong and his colleagues have published a few articles giving an overview of service development research (DeJong, Bruins, Dolfsma, and Meijaard, 2003; DeJong and Vermeulen, 2003). Because their work includes some of the few papers giving an overview of this research area, we have decided to use one of their frameworks as a basis for our literature review. The theoretical framework used is the one applied by DeJong, Bruins, Dolfsma, and Meijaard (2003) and is presented below.

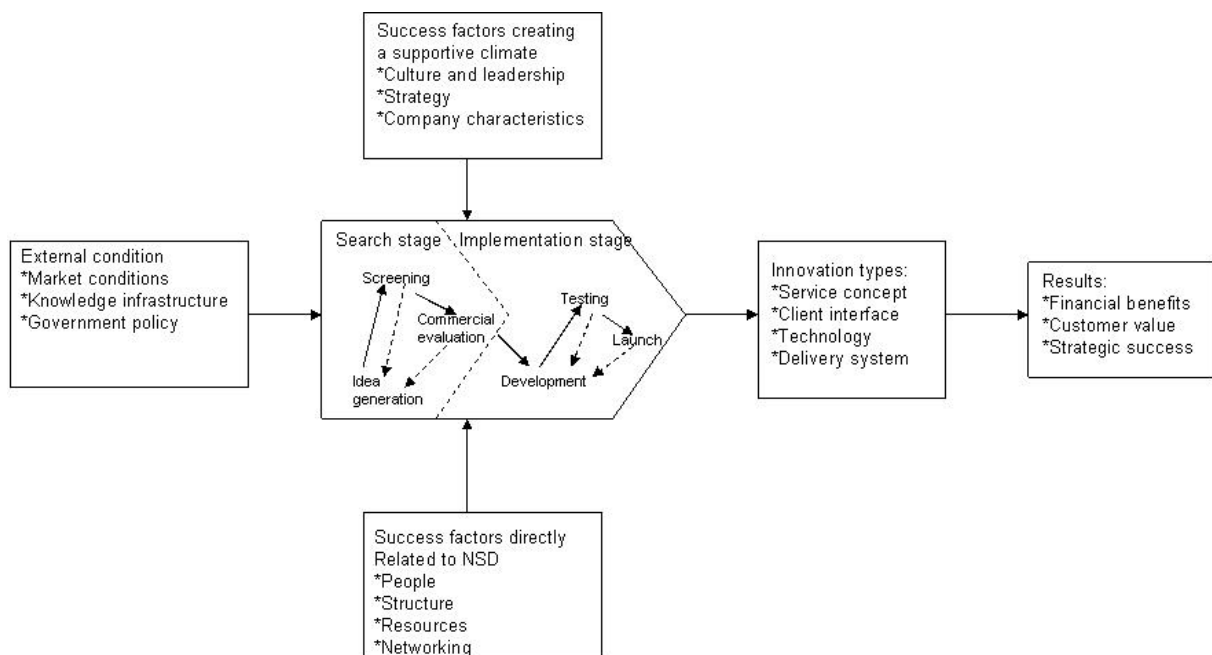


Figure 2.1: Theoretical framework.

The theoretical framework consists of four main parts; conditions/antecedents for an effective service development process, the service development process, types of service innovations, and outcomes/effects/results of service innovations.

*Conditions for an effective service innovation process* include factors that in some way have the potential to influence the effectiveness of the service development process in a company. This can be external factors given by national or local authorities or market conditions that in particular encourage or interfere with service development. It can be internal general factors such as structure of the organization or general leadership and organizational culture. It can also be internal factors specifically related to the service development process, such as characteristics of the people working with the service development or the cooperation climate among them. *The service development process* is based on the six stage model originally proposed by Booz, Allen and Hamilton (1982) as we know it from traditional product development literature. However, as a result of the typically more ad-hoc based and less well structured characteristics of new service development, DeJong et al (2003) simplify the new service development process to include only two stages; the search stage and the implementation stage. From the model we can see that the service development process leads to mainly four *types of service innovations*. These four types reflect typical types of service innovations. However, the four types are not mutually exclusive. New delivery systems can for example be based on technology innovations. Finally, the innovation types are supposed to lead to positive effects *on the service organizations results*. Outcomes typically studied in service development literature are effects on financial results, effects on consumer value, and effects of strategic success.

Based on the four main parts of the theoretical framework, the search terms found in table 2.1 were chosen to reveal relevant literature for each of the four main parts. These search terms were applied in an open search for literature on the Internet as well as to identify relevant articles in four service management and innovation journals.

Conditions	Process	Types	Results
“service innovation conditions”	“service development process”	“service innovation type/types”	“service innovation performance”
“service innovation requirements”	“service development method”	“service innovation form/forms”	“effect(s) of service innovations”
“service innovation determinants”	“service development methodology”	“service innovation categories”	“service innovation effect(s)”
“service innovation success factors”	“service development methodologies”	“service innovation typology/typologies”	“service innovation outcome”
“service development conditions”	“service development techniques”	“type/types of service innovation”	“outcome of service innovation”
“service development requirements”	“service development techniques”	“form/forms of service innovation”	“service development performance”
“service development determinants”	“service design process”	“categories of service innovation”	“effect(s) of service development”
“service development success factors”	“service design method”	“typology/typologies of service innovation”	“service development effect(s)”
“antecedents of service innovation”	“service design methodology”	“service development type/types”	“service development outcome”
“influences of/on service innovation”	“service design methodologies”	“service development form/forms”	“outcome of service development”
“determinants of service innovations”	“service design technique”	“service development categories”	
“success factors of service innovations”	“service design techniques”	“service development typology/typologies”	
“antecedents of service development”	“service innovation process”	“service development type/types of service development”	
“influences of/on service development”	“service innovation method”	“form/forms of service development”	
“determinants of service development”	“service innovation methodologies”	“categories of service development”	
“success factors of service development”	“service innovation technique”	“typology/typologies of service development”	
	“service innovation techniques”		

Table 2.1: Search terms used for literature review.

As can be seen from table 2.1, several search terms were used to reveal relevant literature within each of the four main parts of the theoretical framework. All of the

search terms were used in quotation marks in the open search procedure, but in the screening of journal articles, components of the terms were also accepted as relevant.

## **2.2 Literature source selection and procedures**

As indicated above, we used two search strategies to reveal relevant literature. In the journal search, the four journals we considered to be most relevant for the topic “new service development” were scrutinized carefully. The journals were Journal of Service Research, Service Industries Journal, Journal of Product Innovation Management, and International Journal of Service Industry Management. The journals were studied article by article for relevance in volumes from 2000 to 2006. Main keywords used for selection of articles were comprised from the key terms of table 2.1 and included “redesign”, “antecedents of new service development effectiveness”, “new service teams”, “service innovation”, “innovation strategy”, “new service design”, “innovating”, “new service development”, “innovator”, “product innovation”, “innovation” (see Appendix B, column 2, for a complete overview of the keywords used to identify relevant articles).

The second strategy was an open search for relevant literature based on the search terms presented in table 2.1. The search terms were used in four bases of potential literature; Google, Google Scholar, ABI Inform Global, and Business Source Complete from EBSCO. For a few of the search terms several hundreds of hits were revealed. When this was the case, only the 50 most relevant hits as determined by the relevance computation of the search engines were explored by the researchers. However, this was mainly the case for the Google search on the search terms for the service process part.

## **2.3 Characteristics of the literature identified and reviewed**

To give the reader an impression of the literature we have reviewed, various characteristics of the literature are presented in this chapter. Table 2.2 shows in what kind of outlets the literature in the review is published.



Type of outlets	Number
Refereed articles	75
Reports	12
Working papers/Conference papers/Notes	20

Table 2.2. Type of outlets.

Table 2.2 shows that the main part of the review is based on refereed articles from scientific journals. Some of the literature is also reports from universities and research institutes. The report category also includes PhDs and Master theses. The last category includes working papers and conference papers. It also includes a few papers (or notes) that have been difficult to categorize as either working papers or conference papers.

Table 2.3 illustrate the relative distribution between empirical and non-empirical (or conceptual) contributions.

Type of contribution	Number
Empirical	77
Non-empirical/Conceptual	30

Table 2.3. Type of contribution.

The results from table 2.3 show that the main part of the sample reported empirical studies. Please note that articles that had a literature review character are categorized as non-empirical contributions. Articles with conceptual elements combined with, for example, a case study are categorized as empirical contributions.

Among the empirical contributions, there is a split between general empirical contributions and contributions focusing one single service.

Empirical context	Number
General	33
Telecom/mobile services	7
Airline and tourism services	5
Finance/banking	17
Other services	15

Table 2.4. Contexts for empirical studies.

As can be seen from table 2.4, most of the empirical contributions have a general character, meaning that the empirical context for the studies includes two or more service categories or service industries. Financial services are the single service industry that has attracted most empirical research, while airline/tourism and telecom/mobile services also have been focused quite comprehensively in empirical studies. Examples of services within the “Other services” category are retailing, theatres, online newspapers, hospitals, knowledge intensive services, and information and communication services. The context for the empirical studies shows the same pattern as revealed by Küpper (2001). She also found services in general and financial services to be the main categories of service context in service innovation studies.

The last table describing characteristics of the literature sample shows when (which years) the contributions are published.

Year of publication	Number
Before 2000	14
2000	10
2001	8
2002	7
2003	12
2004	22
2005	17
2006	8
Unknown	9

Table 2.5. Year of publication.

Among the contributions published before 2000, the two oldest articles were from 1988. Among the articles published after 2000, we can see that most of them are from

2004 and 2005, indicating that the literature in the sample is rather new. Nine of the contributions cannot be dated to any particular year. These contributions are typically notes or working papers that are not yet published in any formal outlet. The distribution may not be used to suggest that service innovation literature has received more attention recently because we chose to focus recent literature in the journal search procedure. That this area of research has been given recent attention however, may be better illustrated through searching Google Trends for the term “service innovation”. This reveals a significant increase in search and news media using the term recent years.



### 3 Findings from the review

As presented in section 2, two procedures were applied to identify relevant literature on service innovation and new service development. In this section, we first report the findings from some of the recent reviews on service innovation identified. This represents a kind of status of the knowledge of service innovation generally agreed upon. We then present recent findings on service innovation identified through the journal search procedure. Next, we present the findings from the open search on service innovation literature. In this way, we intend to start with generally accepted findings, then introduce recent findings given general support through their publication in high quality scientific journals, and finally introduce a collection of recent findings that also includes not yet empirically supported findings. The framework introduced in section 2 adapted from DeJong et al. (2003) is applied to organize the literature findings.

#### 3.1 Empirical findings from recent reviews

Using the framework of DeJong et al. (2003) presented in section 2, we may summarize the findings on service innovations identified in other recent descriptive reviews (DeJong et al., 2003; DeJong and Vermeulen, 2003; Küpper, 2001).

Based on the unique characteristics of services (intangibility, inseparability, heterogeneity and perishability (Zeithaml, Parasuraman and Berry, 1985), DeJong et al. (2003) suggest that the *innovation types* of service innovations differ systematically from the innovation types of product innovations. As also mentioned in section 1, it is suggested that innovations in service industries are more incremental and less radical than innovation in other industries (Johne and Storey, 1998). It is also suggested that it is less technology based (Cooper and de Brentani, 1991) and not so often driven by R&D efforts (Brouwer, 1997). De Brentani has suggested that service innovations are easily copied and thus, that they are more difficult to protect, for example through patents (De Brentani, 1991). Most of these findings are also supported by empirical findings (Tether, 2004). Tether (2003) makes the following, empirically supported, propositions on service innovations:

- It is more difficult to separate product, process and organizational innovations for services.
- Service innovations are more often organizational innovations

- Service innovations are not so often driven by R&D
- Service innovations do more often have qualitative and intangible effects such as increased knowledge and improved collaboration

For a long time it has been assumed that service industries are less innovation intensive than other industries (DeJong et al., 2003), but this may also be due to characteristics of public innovation statistics and its tendency to not register some of the innovation types that are typical to services (Drejer, 2004).

From studies of the service *innovation process*, it is found that the innovation process is less formal in service firms (Kelly and Storey, 2000). Some authors (e.g. DeJong et al., 2003) suggest it may best be characterized as a trial-and-error process. Because it is difficult to separate different innovation types for service innovations, it is also more difficult to identify the stages of a stage-gate innovation process. This makes it less relevant to apply prescriptive stage-gate innovation process models, such as the model by Booz, Allen, Hamilton (1982) for service innovation processes. Usually, this is overcome by assuming the service innovation process is a two-stage process (DeJong et al., 2003; Menor, Tatikonda and Sampson, 2002). Because services are often labor intensive, it is suggested that service innovations are also more labor intensive and less investment intensive. Thus, it is assumed that service innovation processes are more easily terminated due to fewer investment based lock-in effects (DeJong et al., 2003). It is also assumed that communication among participants in the service innovation process is more difficult due to services being intangible (Ennew et al., 1992). It is also suggested that because service innovations are more often customer driven, customer involvement in service innovation processes will be more typical (Easingwood, 1986). Another reason for the greater involvement of customers in service innovation processes is the inseparability of production and consumption. There are, however, also arguments for less customer involvement in service innovation processes. For example, intangibility may make customer involvement more difficult and thus, less typical for service innovation (Alam, 2002).

For the process oriented *innovation conditions* of DeJong et al. (2003), it is assumed that human resources are more important to service innovations (De Brentani, 2001). Among the structural conditions, some studies have investigated internal cooperation and cross-functional teams as conditions for service innovation (e.g. Gallouj and Weinstein, 1997), and from these studies it is proposed that these structural conditions

are more important for the success of service innovations. For the other resource based conditions, the access to ICT as a resource has also been discussed. For a long time it was assumed that because service innovations are less technology driven, ICT resources would also be of less importance to service innovation success. However, some service industries are among the most ICT-intensive (e.g. financial services), suggesting that at least for some service industries, ICT resources may be a very important determinant of service innovation success. For example, much of the recent productivity growth in service industries is explained by ICT use (Triplett and Bosworth, 2003) suggesting that the old myths of lacking technology intensiveness do no longer hold. For the network oriented resource process conditions it is assumed that service innovations to a greater extent requires value network collaboration (Kline and Rosenberg, 1986). DeJong et al. (2003) mention several climate related conditions for service innovation, but it is difficult from their treatment to find arguments why these conditions should be more important for service innovations than for other innovations. We have already mentioned the assumption that service innovations are less driven by technology in general and by R&D. This would mean that technological innovations are of less importance to service innovations than other innovations (DeJong, et al., 2003). As seen from the discussion of ICT driven innovation in service industries, this assumption is debatable, but it would mean that access to human resources, such as knowledge resources and creative capital outside the traditional R&D institutions is more important to service innovations, at least for the knowledge intensive service industries (Den Hertog, 2000). Because service innovations are more often organizational innovations it is also assumed that the obstacles of service innovations are mainly organizational, such as lack of knowledge in service organizations (Sirilli and Evangelista, 1998). Finally, it seems to be general support for the hypothesis that public financial support instruments and the public innovation policy do not stimulate service innovation particularly well (DeJong et al., 2003). Public, and in particular, central government financial support is thus, of less importance as a condition for service innovation (DeJong et al., 2003).

As briefly mentioned above, Tether (2003) suggests that the *innovation outcomes* of service innovations are more often qualitative. Consequently, they are also more difficult to measure. Among the innovation outcomes suggested by DeJong et al. (2003) to be more typical of service innovations are customer value outcomes and strategic outcomes. On the other hand, cost efficiency and short term profitability effects are less likely outcomes of service innovation activities.

If the empirically supported assumptions made above on service innovations are universal to all types of service innovations and innovations in all service industries or if they are more correct for some types of services activities and some service industries has been given rather little attention. For example, only a few empirical studies investigating these assumptions across different service industries are found. The few examples of such studies (e.g. Tether, 2003, Evangelista and Savona, 2003) often apply a well known and adopted service typology as their basis for cross-industry comparison rather than a typology of service innovations.

The brief summary of findings from previous reviews above suggests a structuring framework for the presentation of review findings. The structuring framework is based on a refinement of the general DeJong et al. (2003) framework that is used throughout this report. The refined framework extends the DeJong et al. (2003) framework in an explanatory direction including a way to organize explanatory studies of service innovation. The refined framework is shown in figure 3.1.

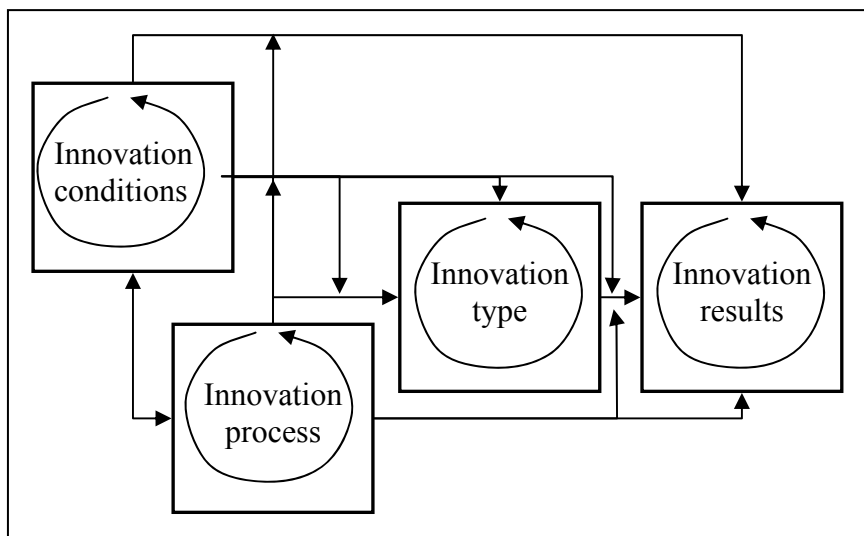


Figure 3.1. Framework used for structuring the review

From figure 3.1 we identify the three main components of the DeJong et al. (2003) framework, innovation conditions, innovation processes, innovation types and innovation results. In the DeJong et al. (2003) framework a simple relationship is assumed between these components. From the empirical studies reviewed by DeJong et al. (2003) we find that the relationship is far more complex. First, studies may be descriptive, focusing each of the components or relationships between parts of each



component. This is illustrated by the circular arrow of each component in figure 3.1. Studies may also be explanatory. The simplest form is a study investigating the direct relationship between two parts of the components of 3.1. This is illustrated by the direct and reciprocal arrows of figure 3.1. An example is studies investigating the relationship innovation conditions and innovation results. More complex models may also be applied in explanatory studies. Such studies suggest one or more components mediating or moderating the relationship between other components. Moderation is illustrated by arrows ending at another arrow in figure 3.1. An obvious example is studies investigating the mediated relationship between innovation conditions and innovation results, where innovation process characteristics mediate the relationship. Some studies suggest the relationships are moderated by service sector or service attributes such as intangibility or inseparability (e.g. Methlie and Pedersen, 2005). These may also be represented in the above framework by considering service sectors or service attributes be represented as innovation conditions. In the following reporting of literature review findings, the framework of figure 3.1 will be applied. How it is applied, however, varies by the component being focused in the review.

## **3.2 Journal search findings**

All identified contributions are listed in appendix B. The presentation of the journal contributions are organized by the DeJong et al. (2003) framework presented in section 2 with findings related to service innovation types first, processes next, innovation conditions third, and innovation outcomes fourth. In addition, appendix B also shows the type of contribution and the sector focused. Contribution type and sector are only discussed in the presentation if this limits the validity or generality of findings.

### **3.2.1. Service innovation types**

18 (42%) of the identified journal articles include discussions of *innovation types*. The most traditionalist of these use current findings on service innovation to *describe* the occurrence of specific types of innovations in service industries (e.g. McCabe, 2000; Toivinen, 2004; Cainelli, Evanelista and Savona, 2004; Bryson and Monnoyer, 2004; Hull, 2004). These contributions follow a demarcation approach underlining the uniqueness of service innovations and are most often mainly descriptive.

More radical redefinitions of service innovation typologies have also been identified in this literature. For example, Djellal and Gallouj (2006) suggest restructuring old categorizations of innovation types into a new categorization of horizontal and vertical

innovations. Horizontal innovations cross traditional barriers represented by the value network of a service, and Djellal and Gallouj (2006) suggest applying the new framework to stimulate the innovation of new services in health care.

Some of the more *explanatory* contributions use innovation typologies as a basis for suggesting how innovation conditions and innovation process characteristics may differ, and should differ, across service innovation types. Consequently, they use innovation types to develop a form of contingency theory for innovation types and successful innovation conditions/processes. Some contributions of this kind focus contingencies at the industry level and are less useful for firm level prescriptive purposes. For example, Camacho and Rodriguez (2005) use empirical data and classification techniques to develop a typology of service innovation types that may be used as a contingency classification framework. The classification results in a three category typology of innovation types, but it is mainly applicable to innovation activities at the industry level and provides few guidelines for contingency models at the firm or value network level. A similar approach is followed by Leiponen (2006) focusing more specifically on business services.

Much more valuable for prescriptive purposes at the firm level is De Brentani's (2001) classification of discontinuous versus incremental innovation types and their corresponding innovation conditions and processes. Her classification may be used to identify success factors for the two types of innovations and to see that these success factors are carefully considered during service innovation processes. For example, she identifies client/need fit as the most important success factor for incremental innovations and innovation culture as most important for discontinuous service innovations. A more complex typology is developed by Avlonitis, Papastathopoulou and Gounaris (2001) suggesting six service innovation categories. The framework is mainly developed for financial services and may be applied in ways similar to that of De Brentani (2001) as a contingency model based on service innovativeness as the contingency variable. Instrumental variables are innovation process formalization and cross-functional involvement and the outcome variable is a complex innovation effects/results variable. As with most contingency approaches, the methodological approach is descriptive and prescriptive application of the framework requires stability in all factors not included in the contingency model.

Another set of contributions are more *normative* in their approach and suggest extending currently known service innovation types. One example is the concept of encapsulation used by (Howells, 2004) to suggest service innovations that encapsulates current product or service offerings. A similar example is found in the term product-service innovations of Edvardsson, Enquist and Johnston (2005). Another example is the introduction of the term “reparative” new service development to describe service innovations resulting from the identification of high risk problems in current service offerings or processes (Shulver, 2005). “Reparative” service innovations differ from “speculative” service innovations that often are more radical and risky.

While the “reparative” service innovation type suggested by Shulver (2005) is founded in current service offerings, other contributors suggest new types of service innovations or new frameworks of service innovation types. For example, Meyer and DeTore (1998) suggest focusing on component based service innovations as a basis for new service innovations. Component based innovation has been used much in product innovations to develop product platforms where components may be combined in new ways to create product variations. Meyer and DeTore suggest applying the componentization principles in their 1998 article (Meyer and DeTore, 1998) and the platform principles in their 2001 article (Meyer and DeTore, 2001) to service innovations. Even though their articles do not suggest prescriptive methodologies, their ideas provide valuable prescriptive insight into new service innovation types. As an example of contributions suggesting new frameworks of innovation types, Berry and Lampo (2000) is interesting. They suggest 5 types of service innovations differing from the categorization of Den Hertog (2000) used by DeJong et al. (2003) and many other authors. These types include self-services, direct services, pre-services, bundled services and physical services. Berry et al. (2006) later refine the framework by introducing four service innovation categories along the dimensions of type of service and type of benefit. Both categorization schemes provide ideas for new ways of service offerings. Another example is the service types offered by the 76 standard solutions of the TRIZ methodology (Chai, Zhang and Tan, 2005). While the TRIZ methodology also offers service innovation process methodologies, it was originally developed for product innovations. Still, it may be used to suggest innovation ideas for new service innovation types.

### 3.2.2. Service innovation processes

30 (70%) of the identified journal articles include discussions of *innovation processes*. These contributions may be categorized as conceptual versus empirical, but this offers little insight into how results should be interpreted. Thus a categorization based on the theories, conceptual framework or constructs applied in the study is required. When looking at the theories, conceptual frameworks and concepts applied in these articles it is difficult to identify shared approaches represented by research themes or “programs”. Instead, we suggest applying the general framework of DeJong et al. (2003) applied in this report as a structuring framework. Thus, we categorize articles according to the number of innovation process variables investigated first, and according to the purpose of introducing these variables next. The structure is shown in figure 3.2.

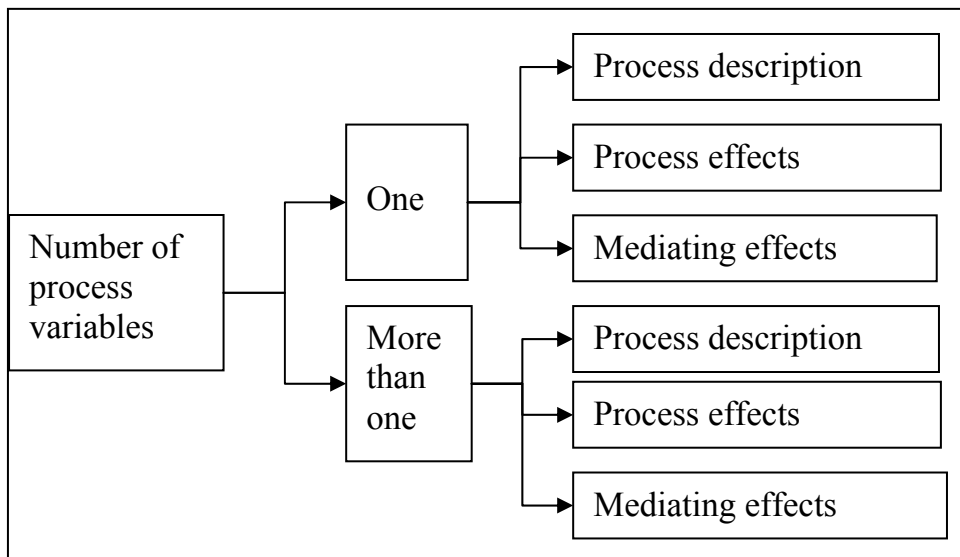


Figure 3.2. Categorization framework of process contributions

As seen from figure 3.2, we first categorize the conceptually simpler articles in one group. The other group includes articles with more complex models or more qualitative articles investigating a broader range of process variables. Both groups of articles may be further categorized by purpose. Some of the articles are mainly descriptive. The explanatory articles may be categorized as either investigating direct relationships between process variables and non-process variables or they may investigate mediated or moderated relationships where process variables are mediating or where other variables mediate the effects of process variables. The presentation of articles is organized by this categorization framework starting with the conceptually simpler contributions first.

### *Articles focusing an individual characteristic*

Some articles are rather simple in their conceptual basis and focus mainly on *describing* a single characteristic of the service innovation process. An example is the article by Abramovici and Bancel-Charensol (2004) focusing customer considerations in the service innovation process. It is difficult to derive prescriptive implications from descriptive articles of this kind.

Of more relevance to prescription are the articles with an *explanatory* purpose. The simplest explanatory articles focus the performance or non-performance effects of a single service innovation process characteristic. The *non-performance* variables being investigated may be innovation types or characteristics of the innovation. An example of an article discussing the effects of customer involvement on the type of innovation is Edvardsson, Enquist and Johnston (2005). They refer to a case study of IKEA and suggest that for some types of innovations, customer involvement may be stimulated through “hyperreal service experiences” obtained through both virtual and hyperreal simulations. An example of a contribution discussing the effects on innovation characteristics is the article of Ramirez (2004) suggesting the involvement of customer support in the innovation process to ensure ease of use in service innovations. While studies of customer involvement also investigate the effects of customer involvement on traditional performance variables, Matthing, Sanden and Edvardsson (2004) investigated the effect of the characteristics of customers involved in the service innovation process on the innovativeness of the suggested innovations. They found support for less experienced customers generating more innovative suggestions than more experienced or professional customers.

While the effects of service innovation process characteristics on non-performance variables are interesting in general, the effects on *performance* variables are even more interesting when seen from a prescriptive perspective. In another study of similar design as Matthing, Sanden and Edvardsson (2004), Magnusson, Matthing and Kristenson (2003) investigated three different outcome variables from customer involvement, originality, user value and producibility (realism). These differ from the panel evaluations applied in Matthing, Sanden and Edvardsson (2004) in being more performance oriented. Another example of a study concluding mainly on the effects of an individual process characteristic on performance is De Brentani (2001) concluding

that formalization of the NSD process is a general success factor in service innovations. Success, however, remained implicit in the study of De Brentani (2001).

De Brentani's (2001) main purpose, however, was to investigate differences in the effects of innovation process and conditions characteristics on success for radical versus incremental service innovations. While NSD formalization was found to be a general factor, she concluded that formalization was even more important to radical service innovation success. This shows an example where the effects of service innovation process characteristics are *mediated* by innovation type. Another example is a study by Urritiaguer (2004) who investigated the effects of the background of the managers involved in the innovation process on the innovativeness of theater plays. This examples illustrates a study where the outcome variable is a non-performance variable. Urritiaguer (2004), however, found the effects of background to be eliminated when controlling for organizational variable.

Another type of moderated or mediated effects study is found in Froehle et al. (2000) where NSD speed, that is a process characteristic, was suggested to mediate the effects of innovation conditions on NSD effectiveness. NSD effectiveness was measured as the number of innovations, a non-performance variable. An example of an article studying the mediated effects on performance, measured by a complex NSD success measure is Lievens and Moenart (2000). They considered uncertainty reduction in the innovation process as a mediating variable between innovation conditions such as innovation climate and performance, and innovation performance.

#### *Articles investigating multiple characteristics*

The first type of contributions investigating multiple innovation process characteristics is the *descriptive* article. For example, Vermeulen and Dankbaar (2002) investigated the characteristics of innovation processes in an empirical study of the financial services industry. They found true multidisciplinary projects and customer involvement to be rare and much of the communication was found at the interface between marketing and IT-departments. Descriptive studies may also be more comparative. For example, Wong and He (2005) compared the NSD process of KIBS firms using data from a CIS-like Asian study to find that KIBS innovation processes were less likely to involve overseas partners. As with the descriptive studies of single innovation process characteristics, the multiple characteristics studies are also difficult to use for prescriptive purposes.

A study that is difficult to classify as either descriptive or explanatory was conducted by Kelly and Storey (2000). They tried to identify prospectors, analyzers and defenders/reactors by investigating the extent of formal NSD-processes used by these firm categories. They also measured satisfaction with the NSD-process, but this variable was not linked to formalization of NSD-processes. As many other authors they had difficulties identifying formal NSD processes, e.g. on idea generation, and few significant differences were found between prospectors, analyzers and defenders/reactors.

Among the obviously *explanatory* studies we find studies of direct effects between multiple service innovation characteristics and performance and non-performance variables. For example many studies investigate the complex relationships between service innovation process characteristics and their effects on other *non-performance* variables. For example, in a case study of the financial services industry, McCabe (2000) studies the interaction between six innovation process characteristics and their effect on organizational innovation, a specific innovation type. Similar problems are studied by Perks and Riihela (2004) investigating the effects of inter-functional integration in the NSD process on the quality of the NSD process. Their results of a two-case study of postal services suggest that formalization of the NSD process, also in terms of inter-functional integration improves NSD process quality. A similar focus was maintained by Blazevic, Lievens and Klein (2003) trying to identify the antecedents of effective NSD processes when measured by NSD project learning and time to market. They use the same four telecom cases as Van Riel and Lievens (2004) and discuss a number of process antecedents including decision architecture, team memory, information awareness, information processing capabilities and nature of communication. Because the study was qualitative it was difficult to identify differences in influence, but the authors argue that all these antecedents are important. Van Riel and Lievens (2004) used the same cases, but they categorized the cases according to NSD decision making success. They also focused more decision oriented antecedents including cognitive style, attitudes and knowledge of diverse types. As for most case studies, conclusions are qualitative and it is typically argued for an importance of all antecedents. This makes it difficult to derive at prescriptive managerial implications from these complex and industry specific qualitative case-studies. However, quantitative studies are also found in this category. For example, Camacho and Rodriguez (2005) used Spanish CIS-data to investigate differences in

innovation characteristics, including process characteristics between high, medium and low innovativeness firms. They found systematic differences between the three types of firms, but firm categorization was sector based, so their conclusions are of little assistance to managers at the firm or network level.

A typical explanatory study of the effects of interacting process characteristics on *performance* is found in Hull (2004a). In this study Hull (2004a) suggests the use of technology tools, cross-functional organization and formalized processes interact to influence service innovation performance. In a second study, Hull (2004b) suggests the interacting process characteristic's effect on service innovation performance to be moderated by innovation strategy. Integrating two lines of research in service innovation (process formalization effects and cross-functional organization effect), the two articles represent a valuable structuring model contribution. Other authors have focused on other organizational elements in service process innovation team formation. For example, the effects of three types of innovation process leadership styles, communicative, participating and enabling styles, on NSD success were studied by John and Harborne (2003). Another study focusing communication and information related attributes of the service innovation process was the study of Van Riel, Lemmink and Ouwersloot (2004). They suggested a model including the effects of information gathering, use and diffusion on short and long term innovation success. The theoretical original model was extended to include organizational factors, such as innovation climate to obtain significant explanatory power. Of the information gathering attributes, information gathering on technology and customers were found to affect innovation success positively whereas information gathering on competitors was found to influence success negatively.

The most comprehensive studies of service innovation process characteristics suggest *moderated or mediated effects* on performance and non-performance. For example, Storey and Kelly (2001) suggested the interaction of service innovation processes and innovation strategies and its effects on NSD performance. However, the final conclusions of the article focus mainly on the ways service innovation performance is measured. Carvalho Vieira et al. (2004) suggest a comprehensive model of strategic and environmental factors affecting a complex innovation outcome variable. Among the strategic factors is the quality of the innovation process, suggesting that innovation processes moderate the effects of environmental and strategic innovation drivers. Vermeulen et al. (2005) also suggest a comprehensive model of service innovation.



Proposing that the effects of process characteristics on innovation outcomes, including sales growth, are moderated by service sector, they study seven characteristics, of which many are process related. For example, the documentation of the innovation process, the use of external networks in the innovation processes, the use of market research, cooperation and the involvement of employees in the process were all found to significantly influence innovation outcomes. Sector was found to moderate the relationship making it stronger for some sectors than others. A complex model including the effects of six characteristics of the NSD process on financial and non-financial outcomes moderated by six innovation types is suggested by Avlonitis, Papastathopoulou and Guonaris (2001). Conducting an empirical study in the financial services industry they focused NSD process activities, process formality and cross-functional involvement. As mentioned above, Hull (2004b) suggested the interacting process characteristics effects on service innovation performance to be moderated by innovation strategy. His resulting model also represents a comprehensive but operational model of moderated effects of service innovation process characteristics. As such it represents an interesting basis for prescriptive suggestions.

In addition to contributions that could be categorized by the categorization framework illustrated in figure 3.2, some articles that were difficult to categorize were found. Common to these articles where their more *normative* orientation. For example, the conceptual article of Chai, Zhang and Tan (2005) suggesting how the TRIZ methodology may be adapted to service innovation is not easily placed within our categorization framework. It involves all elements in the framework, but uses theoretical arguments for suggesting prescriptive methodology rather than trying to describe or explain service innovation components or relationships. Among the prescriptive articles on service innovation, the TRIZ application articles represent one of the most comprehensive frameworks for service innovation methodology.

Other normative articles are also found, but they focus individual process characteristics and do not place their prescriptive arguments within a comprehensive framework like the TRIZ articles. For example, Liden and Sanden (2004) suggest an innovation process giving and pricing service guarantees to be a way to stimulate cost reducing innovations. We also find discussions of the appropriateness of prescriptive and other service innovation process methodologies (e.g. Toivonen, 2004). An article that is difficult to classify is the article by Shulver (2005) suggesting that increasing the attention to internal capabilities and market requirements in service innovation

processes may help generating new types of service innovations termed as “reparative” (see also 3.2.1).

To *summarize* the findings for service innovation process contributions, the number of explicit prescriptive contributions is low. The descriptive and explanatory studies are characterized by fragmentation of theoretical basis, constructs applied and themes investigated. It is difficult to unify these findings into prescriptive recommendations for NSD process management. This is partly due to a longer history of service management and marketing than what is covered by our review, but mainly due to a lack of generally agreed-upon research themes or programs in the literature on service innovation processes, e.g. studies of the effects of specific service process characteristics on innovation outcomes. The closest to what may be identified as such a theme or program is the recent research on the effects of customer orientation and customer involvement on NSD process quality and innovation performance (e.g. Alam, 2002; Magnusson, Matthing and Kristenson, 2003). Also, the number of studies focusing process formalization effects and the effects of cross-functional integration is large enough to consider these two issues common themes in service innovation research. Still, fragmentation is more characteristic than theme based systematic structure of this research.

### **3.2.3. Service innovation conditions**

18 (42%) of the identified journal articles include discussions of *innovation conditions*. Three of these articles discuss innovation conditions only, four discuss direct relationships between innovation conditions and performance or non-performance variables, whereas the rest (11) includes service innovation process characteristics in some way into their discussion. The last of these three article categories has, thus, been reviewed and discussed in section 3.2.2. We will, however, also discuss some of these articles here, in particular the issues more directly related to findings on innovation conditions not discussed in section 3.2.2. It should be obvious that most of the articles of the first category are descriptive, whereas the articles in the second and third category are mainly explanatory. None of the articles are explicitly normative in approach.

Among the articles with a *descriptive* approach mainly discussing innovation conditions we find two contributions in the knowledge intensive business services KIBS research tradition viewing KIBS as a driver of innovation in other sectors

(including other service sectors) (Czarnitzki and Spielkamp, 2003; Wood, 2005). These articles are more occupied with the role of services in innovation, in particular KIBS as an important driver of service innovations. Thus, their focus is on the industry level, but their conclusions may also be interpreted at the firm level, suggesting that networking with KIBS is a condition for firm level service innovation.

Among the articles with a more *explanatory* approach, articles suggesting direct relationships between innovation conditions and outcomes as well as articles suggesting mediated relationships are found. Starting with the *direct* relationship articles, we also among these articles find contributions more relevant at the policy level than at the firm level reviewing more structural conditions of innovation that are beyond the control of firm and network level management (e.g. Bryson and Monnoyer, 2003). The resulting articles either focus the effect on a specific innovation condition on performance or non performance or the effects of a set of structural conditions. Of the first category we find the article by Leiponen (2006) suggesting that access to knowledge of different types may differ in importance to incremental versus radical innovations. Her results, however, showed that all types of knowledge except individual level tacit knowledge were positively related to all types of innovations. Two articles investigate the relationship between a multitude of innovation characteristics and performance variables (Song, Di Benedetto and Song, 2000; Matear, Gray and Garrett, 2004). While similar in applying a broad survey methodology of several service sectors, they differ in their theoretical origins, innovation conditions and performance variables studies. The contribution by Matear, Gray and Garrett (2004) is routed in strategic marketing focusing market orientation, brand investment and NSD capabilities as performance antecedents. Here we see how NSD capabilities are seen as a broad capability that is not further decomposed but instead is seen to interact with traditional strategic marketing success factors. In Song, Di Benedetto and Song (2000), pioneering is focused, and the importance of four advantage oriented drivers – economic advantages, preemptive advantages, technological advantages and behavioral advantages are compared across service firms and countries. The main finding is that technological advantages are less important to performance in pioneering than other advantages for service firms.

The rest of the articles investigating innovation conditions suggest more complex models of the effects of individual and interacting conditions. Typically considering performance effects to be *mediated or moderated* by innovation process characteristics

or to differ across innovation types or sectors. Most of these articles are also discussed in section 3.2.2. An issue that is difficult to place either as a condition or as a part of innovation process characteristics is the presence or content of the firm level innovation strategy. As mentioned above, Hull (2004b) suggests innovation strategy to moderate the relationship between innovation process characteristics and performance. In this study, innovation strategy is seen as an innovation condition. In other studies, the content of the innovation strategy is seen as an innovation process characteristic (Storey and Kelly, 2001; Vermeulen et al., 2005).

Among the studies applying complex models of interacting factors including innovation conditions we find the following innovation conditions mentioned:

- Resource related conditions:
  - Integration or access to IT resources (Froehle et al., 2000; Hull, 2004b)
  - Integration or access to knowledge resources (Urritiaguer, 2004; Wong and He, 2005; De Brentani, 2001)
  - Network access and resources (Vermeulen et al., 2005)
- Organizational conditions:
  - Innovation climate (Lievens and Moenaert, 2000; Van Riel, Lemmink and Ouwersloot, 2004; De Brentani, 2001)
  - Centralization (Lievens and Moenaert, 2000)
- External conditions:
  - Market competitiveness (Carvalho Vieira et al., 2004)
  - Regulation (Carvalho Vieira et al., 2004)

Of these conditions, resource related and organizational resources are of most relevance to prescriptive implications at the managerial level. Studies focusing access to IT resources come with considerable industry level support. For example, innovative IT-use has been considered one of the main factors explaining recent increase in service sector productivity (e.g. Triplett and Bosworth, 2003). Hull (2004a, b) suggests IT as innovation tools are an important antecedent of innovation performance, whereas Froehle et al. (2000) suggest integration of IT in firm operations to be an important determinant of NSD speed and NSD effectiveness. Both suggestions are supported empirically. Knowledge resources are also investigated in several studies. Urritiaguer (2004) suggested professional knowledge to be an important determinant, but its effect to be moderated by organizational factors and

Wong and He (2005) suggested social capital to be important, but both these studies are industry specific. More general in approach are De Brentani (2001) focusing the expertise of front line employees as one of many relevant innovation conditions. The final resource related condition identified among the articles is Vermeulen et al.'s (2005) finding that use of external networks significantly led to more service introductions, particularly in supplier dominated services. Again, this condition was only one of several in the conceptual model of Vermeulen et al. (2005).

Among the most frequently studied conditions we find the organizational condition termed innovative climate. It is not surprising that we find a considerable number of articles integrating this as an important innovation condition in their models (Lievens and Moenaert, 2000; Van Riel, Lemmink and Ouwersloot, 2004; De Brentani, 2001). The importance of an innovative climate is also well supported empirically and is often used normatively as well. For example, organizations measure their innovative climate using measures such as CCQ (Ekvall, 1996) or KEYS (Amabile et al., 1996) and use this as a basis for innovation climate improvement programs. The other organizational condition discussed in our articles was centralization, which Lievens and Moenaert (2000) found to affect NSD project communication negatively and to negatively influence uncertainty reduction and firm success.

Only one of the journal articles mentioned what DeJong et al. (2003) categorize as external conditions. Carvalho Vieira et al. (2004) in a study of Portuguese financial service firms suggested that market competitiveness and regulation were important innovation conditions, but found little support for this proposition empirically. Only regulation was found significantly important to one type of service innovation results – market development.

None of the 18 articles studying innovation conditions had a normative focus. Most of the articles empirically testing complex models suggest prescriptive implications, but only at the level of proposing that a set of innovation conditions are important. Managerial frameworks or suggestions for how to implement actions stimulating certain conditions are rarely discussed.

#### **3.2.4. Service innovation outcomes**

21 (49%) of the identified journal articles include discussions of *innovation outcomes* in the form of performance outcomes which are focused here. Articles discussing

innovation processes and conditions could be categorized as descriptive and explanatory with several sub categories. For articles discussing innovation outcomes, no articles were identified only discussing innovation outcomes in the form of innovation performance. Thus, no purely descriptive articles were found. Furthermore, the underlying relationship driving innovation performance of each article is discussed in 3.2.1, 3.2.2 and 3.2.3. We find no reason to repeat these discussions here, but choose instead to focus on the outcome concepts discussed and measured in each article.

From the 21 articles including discussion or measurement of service innovation outcomes in some form, we have identified the following outcomes:

- Service innovation effectiveness:
  - Process or type concepts and measures (Hull, 2004a,b; Perks and Riihela, 2004; Wong and He, 2005; Kelly and Storey, 2000; Blazevic, Lievens and Klein, 2003)
  - Outcome concepts and measures (Froehle et al., 2000; Magnusson, Matthing and Kristenson, 2003; Urritiaguer, 2004; Ramirez, 2004; Camacho and Rodriguez, 2005)
- Simple performance concepts and measures (performance of innovation versus performance of firm)
  - Simple firm performance concepts and measures (Vermeulen et al., 2005; Son, Di Benedetto and Song, 2000)
  - Simple categorizations success/failure (John and Harborne, 2003; Van Riel and Lievens, 2004)
- Complex performance concepts and measures
  - Components financial, non-financial or both (Lievens and Moenaert, 2000; Storey and Kelly, 2001; Cainelli, Evangelista and Savona, 2004; Carvalho Vieira et al., 2004; Avlonitis, Papastathopoulou and Gounaris, 2001; Van Riel, Lemmink and Ouwersloot, 2004; Matear, Gray and Garrett, 2004)

By service innovation *effectiveness* we mean outcome concepts related to the innovation process or type. These concepts may focus the quality of the process or types of innovations, or they may use more outcome related measures such as the number of innovations or their perceived innovativeness. For example, even though Hull's (2004b) effect model uses the term performance, the final measures used in the

study captures only time and cost reductions in the service innovation process. An example of the latter category of innovation effectiveness outcomes is found in Froehle et al, (2000) who measure their outcome variable as the number of innovations.

From the examples above, we see that innovation outcome here refers to the outcome of the innovation or innovation project. In other studies, authors are more interested in firm effects of innovation. This is what we usually mean by *performance* in strategic management literature. Still, firm performance is a complex concept that may include a multitude of financial and non financial variables. The first category of performance related outcomes we have identified is the simple performance concepts. Sometimes, the simplicity is in the way performance is operationalized, such as in Vermeulen et al. (2005) who measured performance as sales growth and employment growth over a period of one year. In other studies the performance concept may be complex but the simplicity lies in the categorization of cases. This is typical in qualitative studies where cases are classified as either successful firms or failure firms. None of the studies investigated here applied success/failure classifications at the firm level. Instead, the categorization was done at the innovation project level (John and Harborne, 2003; Van Riel and Lievens, 2004).

When considering performance as a *complex* concept this is typically mainly related to firm performance, but examples of complex performance concepts at the project level are also found (Lievens and Moenart, 2000). DeJong et al. (2003) also mention market and country level performance, but firm level performance is focused here. The firm level performance categories mentioned by DeJong et al. (2003) are financial, customer value and strategic success. Among our articles we only find examples of two of these categories. For example, Cainelli, Evangelista and Savona (2004) measured financial performance from three economic indicators including sales and employees growth rate and annual labor productivity. As an example of a carefully developed and applied complex measure of strategic success, Van Riel, Lemmink and Ouwersloot (2004) developed a measure of long, short and indirect success from 13 items reflecting different components of strategic success. Examples of components were improved competitive position and expansion into new markets.

Some authors apply complex measures capturing all three types of performance but did not attempt to integrate them into a composite measure (Storey and Kelly, 2001).

However, most of the studies applied composite measures combining components of all three categories. For example, Avlonitis, Papastathopoulou and Gounaris (2001) used a composite measure of 11 items reflecting financial and non-financial components. Others refer explicit to all categories of performance and combine financial, customer value and strategic success components into a complex composite measure (Matear, Gray and Garrett, 2004). Somewhat surprising, however, was the variation in components and items used in complex performance constructs. At least for measures reflecting managerial perceptions of performance, one might expect standardized and widely applied firm performance measurement scales to be applied.

The multitude of innovation outcome concepts and measures reflects the lack of unified themes or “programs” in service innovation research identified and commented in 3.2.2. For prescriptive purposes one is tempted to put all outcome concepts in the same category and summarize the explanatory findings into what contributes positively to NSD outcomes in general. This, however, will result in much too general prescriptive recommendations. Sometimes short term financial results is the target of innovations, such as cost efficiency process innovations, whereas other times long term effects on customer satisfaction, loyalty and value is the target of the innovations, such as radical service interface innovations. Thus, innovation outcome concepts must also be taken into consideration when transforming empirical findings of explanatory service innovation studies into prescriptive recommendations.

### **3.3 Open search findings**

The second approach applied to identify relevant literature was an open search using public and academic databases and search engines. All identified contributions from applying this approach are listed in appendix A. The presentation of the contributions are organized by the DeJong et al. (2003) framework presented in section 2 with findings related to service innovation types first, processes next, innovation conditions third, and innovation outcomes fourth. In addition, appendix A also shows the type of contribution and the sector focused.

#### **3.3.1. Service innovation types**

17 (23 percent) of the contributions revealed in the open search include some kind of discussion of innovation types. Some of the most common classifications of



innovation types are based on the model presented in chapter 2 (Den Hertog and Bilderbeek, 1999; Den Hertog, Broersma, and van Ark, 2003; Den Hertog and Brouwer, 2000; Dolfsma, 2004). In addition to the pure description and classification of the service types, Den Hertog and Bilderbeek (1999) relate the most important business areas to the various service types. To succeed with new service concepts, they underline the importance of knowledge of the characteristics of existing and competing services. When focus is on new client interface, they underline the importance of understanding the characteristics of actual and potential clients (market intelligence). To succeed with new service delivery systems they emphasize capabilities, skills, and attitude of existing and competing service workers. Den Hertog and Brouwer (2000) define the four innovation types more deeply, and also refer to several concrete types of innovation (with particular relevance for retailing) within each of the four main innovation types. Howells (2006) perspective has a lot in common with the perspective discussed above. He also links the sources of technology, skills, organizational structure and relationships to the development of various service innovation categories. Also, Tether's (2004) classification of service innovations into new services and new service processes are related to service concept and service delivery respectively. In addition Tether (2006) includes organizational change as a service innovation category.

A second widespread classification is based on the source of the innovation idea. The classification includes supplier dominated innovations, client led innovations, innovations in or through services, and more paradigmatic innovations (like the development of e-commerce) (Den Hertog and Brouwer, 2000; van Ark, 2005; Rubalcaba, 2004). Again, the contributions are rather descriptive. While van Ark (2005) gives a general description of each of the typologies, Den Hertog and Brouwer (2000) give more specific examples of innovations (with specific relevance for retailing) within each of the innovation types. According to van Ark (2005), supplier dominated innovations are the most typical innovation within this categorization scheme. Lee, Shim, Jeong and Hwang (2003) also build on the difference between supplier dominated innovations and innovations in the service company. They describe three possible situations. The first one is a pure supplier led innovation where the service company takes advantage of an innovation from a supplier. The second type of innovation is a situation where the service company has a problem, they communicate this to the supplier, and through interaction an innovation is developed to solve the problem. The third innovation type is developed in the service company and

distributed to the supplier so that the supplier can implement the innovation in future supplies to the service company.

A third typology of innovation worth mentioning is based on how radical the innovation is. The categories are new to the market, new to the company services, new delivery process, service modification, service line extension, and service repositioning (Avlonitis, Papastathopoulou and Gounaris, accessed 02.01.2007; Gounaris, Papastathopoulou, and Avlonitis, 2003). In addition to describing the innovation typologies, Avlonitis, Papastathopoulou and Gounaris (accessed 02.01.2007) also link the innovation type to degree- and type of performance. For example, new delivery processes are revealed to be a major success, in particular for profitability and sale, while new to the company services have a moderate level of success, in particular for enhancing image. Although the research has an exploratory character, their perspective indicates what kind of service innovation a company should focus to reveal various performance improvements (please also see chapter 3.2.1).

Herting (2002) has a somewhat alternative perspective on innovation typologies. Innovation is related to internal resources and classified into technical innovations (new procedures and processes, new technology, etc.), administrative innovations (organizational policy, structures, relationships), human resource innovations (change in skills, beliefs and expectations), and service innovation (new outputs are made available for consumers). In addition to the description of the classification, the four types of innovations are also correlated with trust related organizational climate. The results show that administrative innovations correlate positively with trust related organizational climate. A negative correlation is revealed between service innovations and trust related organizational climate. Although the study does not focus effects of innovation types on performance directly, the study shows that innovations in organizations may have both potential positive and negative consequences for the internal milieu of an organization. This may indirectly influence the company's performance.

Services are often part of traditional physical products or goods, and innovations often include some kind of a service that are added to traditional products. In a CRIC briefing (2006) several types of service innovations that can be a complement to traditional products are discussed. The services are monitoring and diagnostic services,

finance and leasing, advice and consultancy updating, maintenance, and recycling. The relevance of the various services will vary across products/goods and according to the life cycle of the product/good. Although the examples of service innovations reported by CRIC (2006) are limited, it points to a very relevant situation – the need for traditional producers of goods to add services to their core physical product.

### **3.3.2. Service innovation processes**

As many as 47 (63 percent) of the reviewed contributions included some kind of discussion explicitly related to service innovation process. It is worth mentioning some descriptive characteristics of the service development process used in the contributions reviewed because some of the article has this as its main focus (Jones, 1995; Papazoglu and van den Heuvelen, accessed 02.01.2007). A general impression is that most of the service development processes described in the literature is a copy or an adaptation of development processes as we know them from product development literature. This is also reflected in the theoretical framework we are using in this report - that is based on the six stages proposed by Booze, Allen and Hamilton (1982). In the model presented in Figure 2.1, the service innovation process is reduced to only two stages (search and implementation) due to the ad-hoc characteristic that are often associated with service development. However, in the literature it is strongly argued for an increase in the formalization of service development processes to improve the effectiveness of service innovation (e.g. Dolfsma, 2004; Martin and Horne, 1992; 1993; Kelley and Storey, 2000). Many studies also describe the service development process in accordance to Booze, Allen and Hamilton's (1982) more structured and formalized description. There also exists literature on service development that uses flow chart methods to structure the service development process or parts of the service development process (Akamavi, 2005). However, four supplements to their process-model are often discussed in the service literature. First, many researchers' points to the importance of having a superior service development strategy as a basis for development of service innovation ideas (Alam and Perry, 2002; Magnusson, 2003; Oke, 2003; Papastathopoulou, Avlonitis and Indounas, 2001). Second, authors also highlight the importance of a post launch evaluation of service innovation processes to learn from the experiences so that future service innovation processes can become more effective and efficient (Magnusson, 2003; Bullinger, Fährnrich, and Meieren, accessed 02.01.2007). Third, some of the literature separate between so called waterfall models and spiral models. The waterfall model is a linear model while the

spiral model is an iterative model (Boehm, 1998; Bullinger, Fähnrich, and Meieren, accessed 02.01.2007). Parallel activities in the service development process (versus sequential activities) are only barely discussed in the literature (Kuusisto and Meyer, 2003, Alam and Perry, 2002). However, there is some literature on this area available from product development literature (e.g. Ulrich and Eppinger, 2004). Finally, Syson and Perks (2004) introduce a network perspective on the service innovation process, arguing for the importance of understanding the service development process within networks.

The spiral model (Boehm, 1988; van de Kar, 2004) originally used in software development, builds on the waterfall model. However, in the spiral model, a simple and basic approach to the waterfall mode is first carried out. Based on this process, an evaluation takes place regarding future potential of the idea. If the evaluation is positive, the process starts all over again, this time with a higher level of details and budget. At the end of this process, an evaluation is again taking place, and depending on the outcome of the evaluation, it is decided whether to proceed with the development project or not. If the evaluation is positive, an even more detailed process is put into effect. This repetitive process takes place until the final innovation is ready to be launched.

#### *Articles focusing an individual characteristic*

Only two of the process articles had a narrow perspective on one of the stages in the service development process. Papastathopoulou, Avlonitis and Indounas (2001) focused organizational factors in the initial stage of the service innovation and suggested “the new way” of formality, centrality, responsibility, etc. of the organization in the initial stage of the service development process. Also, Kelley and Storey (2000) highlighted the initial stages of the service development process (idea generation and screening) and found that idea generation is generally undertaken on an ad-hoc basis and that idea screening often do not support the new service development strategy of a service company.

Also, some of the articles focused new service development process without explicitly focusing the various stages of the process. These articles are generally related to either innovation outcomes (please see chapter 3.3.4) or innovation conditions (please see chapter 3.3.3) of service development process and is reviewed in these sections.

### *Articles investigating multiple characteristics*

Some of the more complex contributions have a focus on the importance of the various stages in the service innovation process in various situations and conditions. One contribution is that the importance of the idea and screening stage of the process is more important the more radical the innovation is. For more incremental service developments, the various stages of the service development process are of less decisive importance (Avlonitis, Papastathopoulou and Gounaris, 2001). Some of the same perspectives are also discussed in their contribution from 2003 (Gounaris, Papastathopoulou, and Avlonitis, 2003). The studies test direct effects of the importance of the various stages on innovations degree of success.

Lievens, Moenart and Jegers (1999) points to internal communication as a critical factor for new service development. Their reasoning is that the effects of internal communication influence the service development process positively by stimulating a positive project climate and good cross functional cooperation. This again is expected to increase the chances for service innovation success. However, the chance of success is moderated by innovation intangibility, simultaneity, heterogeneity and perishability.

Two rather holistic perspectives on service innovation are presented by Menor, Tatikonda, and Sampson (2002) and Stevens and Dimitriadis (2004). The systemic model proposed by Stevens and Dimitriadis (2004) is based on a decision making process founded on successive interactions between individuals and groups. Learning is a function of the number of interactions and how the interactions takes place, and this will determine the service innovation process and the success of the innovation. The “interactors” are people taking part in the innovation work and in general people in the organization and outside the organization. The interaction may be on individual, group or organizational level. In addition, infrastructure is included in the model because it is an enabler of the interactions. Furthermore, the external environment is also part of the model because it may be a source or barrier for innovation.

The other rather holistic perspective is based on the new service development process cycle (Johnson et al, 2000) and presented by Menor, Tatikonda, and Sampson (2002). They divide the service development process into design, analysis, development and full launch. They also specify activities within each of these stages. Furthermore, enablers as people, technology and systems are pinpointed as vital for a successful process. Also, the organizational context and teams, and the dynamic and milieu in the

organization and groups, are decisive for the success of the process. Thus, there is a complicated interplay between many actors and factors throughout all of the stages in the service development process that has to work to ensure service innovation success.

#### *Normative contributions*

When it comes to normative studies, only one of the contributions from the general literature review can be added to the articles discussed from the journal search (please see chapter 3.2.2). This is a working paper written by Froehle and Roth (2006). The authors present recommendations for actions in each of the four service development stages (design stage, analysis stage, development stage, and launch stage). In addition, they highlight three particular important resources in service innovation (physical-, organizational-, and intellectual resources), and present concrete recommendations for development of these resources. The study by Alam and Perry (2002) may also be considered to have a normative approach, but is only applicable for activities performed by the customers (activities that should be performed by customers in each of the stages of the service development process).

#### **3.3.3. Service innovation conditions**

More than half of the contributions reviewed (42, (56 percent)) included discussions of antecedents of /conditions for the service development process or innovation performance. Only one of the contributions was a purely descriptive study on innovation conditions. This study highlighted external barriers to service innovation, like lack of support for trade and internationalization, difficulty in valuing and financing intangible services, lack of adequacy of intellectual property protection, lack of government support to innovation, and distance from innovation systems like research centers. However, most of the studies focused some kind of effects of service innovation conditions on elements of the service innovation process or stages of the service innovation process. As much as 14 studies had their main focus on influences of innovation conditions on innovation performance. Some of the influences were proposed/revealed to have direct effects whereas other innovation conditions were proposed/revealed to have mediated effects on performance. A few of the contributions also touch on discussions of how innovation conditions may influence types of innovations (e.g. Lee, Shim, Jeong, and Hwang, 2003).

### *Effects of innovation conditions on innovation performance*

Among the contributions focusing effects of innovation conditions on performance, we find a variety of innovation conditions and influencing processes (mediated and moderated). Among studies proposing direct effects, we find Martin and Horne (1993) who study effects of a clear service development strategy, fit of new service with current business, use of customer information, use of competitive imitation, and involvement of champions in service development on degree of service innovation success. The importance of integrating consumers' ideas in the innovation process is also supported by Matthing, Sandén and Edvardsson (2004) and Magnusson (2003). Lievens, Moenaert and Jegers (1999) focus effects of internal and external communication on commercial success of service innovation. A study by de Brentani (1993) found effects of quality of execution of the up-front activities, the launch program, expert driven processes, and a supportive and high-involvement corporate culture (which must be considered a mix of process elements and conditions for innovation) on new service success. Oke (2004) also includes a few process elements along with conditions for innovation, and find that lack of employee motivation, lack of innovation legacy, lack of top management support, problems related to protecting innovations with patents, and an ineffective development process are the main barriers to service innovation performance. A study by Edgett and Parkinson (1994) ranks the importance of innovation conditions in the following succession; market synergies, organization of development process, market research, launch effectiveness, market potential, design testing, formalization, and business/financial elements. As can be seen, the innovation conditions also include elements related to the innovation process. Finally, van Riel, Lemmink and Ouwersloot (2004) highlight information gathering, information diffusion, and information usage as the main antecedents for service innovation success.

### *Mediated effects of innovation conditions on innovation performance*

Among the more complex models explaining effects of innovation conditions on innovation performance, we find a study by Lievens and Moenaert (2000). They discuss the importance of organizational antecedents (complexity, formalization, centralization, and project climate) on innovation success, and propose that such effects are mediated by communication type (intra-project communication and extra-project communication) and innovation uncertainty (customers, competitors, technology, and resources). Froehle, Roth, Chase, and Voss (2000) divide their performance measure into process effectiveness and innovation performance. They

find direct effects of team organization and integration of IT in firm's operations on innovation performance while integration of IT in firm's operations and formalization of the service development process are found to have a mediating effect on innovation performance through process effectiveness. A study by Blazevic and Lievens (accessed 02.01.2007) propose effects of nature of communication (innovative communication and coordinative communication) and organizational design (management support, cross-functional interface, organizational diversity, and participative decision-making) on several measures of innovation performance. All of the antecedents are proposed to be mediated by project learning. In a study by Olsen (2006), effects of narrow and broad scanning for market information is proposed to influence service innovation profitability. The effects are supposed to be mediated by service adaptation and spin-off knowledge. Finally, communication is viewed as a main antecedent for innovation performance, mediated by uncertainty reduction (Lievens and Moenaert, 2000).

#### *Effects of innovation condition on innovation process*

Most of the studies relating innovation conditions to the innovation process are discussed in chapter 3.3.2. Therefore, we just summarize and categorize the main antecedents discussed along the same headings as used in chapter 3.2.3.

- Resource related conditions:

Integration and access to IT resources (Kuusisto and Meyer, 2003; Stevens and Dimitriadis, 2005; Bullinger, Fähnrich, and Meieren, accessed 02.01.2007; Menor, Tatikonda and Sampson, 2002; DeJong and Vermeulen, 2003)

Integration and access to knowledge resources (Edvardsson, Haglund and Mattsson, 1995; Stevens and Dimitriadis, 2005; Karapidis, Kienle and Schneider, 2005; Bullinger, Fähnrich, and Meieren, accessed 02.01.2007; Menor, Tatikonda and Sampson, 2002; DeJong and Vermeulen, 2003)

Network access and resources (Alam and Perry, 2002; Stevens and Dimitriadis, 2005; Dewen and Ruoyu, ????)

- Organizational conditions:

Innovation climate (Kjær and Bønnelycke, 2006; Papastathopoulou, Avlonitis and Indounas, 2001; Menor, Tatikonda and Sampson, 2002; DeJong and Vermeulen, 2003)

Centralization (Stevens and Dimitriadis, 2005; Papastathopoulou, Avlonitis and Indounas, 2001; Menor, Tatikonda and Sampson, 2002)



- External condition:

Market competitiveness (Stevens and Dimitriadis, 2005)

Regulations (Stevens and Dimitriadis, 2005; Ahn and Skudlark, 2002)

Among the resource related conditions, the types of IT systems are not very much specified in the articles. The main point is that some kind of information and communication technology, information and resource databases, and management information systems enable a smoother service development process. Access to knowledge resources includes resources as training, education and learning (DeJong and Vermeulen, 2003; Menor, Tatikonda and Sampson, 2002; Karapidis, Kienle and Schneider), human resource management (Bullinger, Fähnrich, and Meieren, accessed 02.01.2007), knowledge management (Karapidis, Kienle and Schneider, 2005), competencies (Stevens and Dimitriadis, 2005), and information, responsibilities, and resources (Edvardsson, Haglund, and Mattsson, 1995). Network access and resources are resources as input from customers (Alam and Perry, 2002; Stevens and Dimitriadis, 2005; Dewen and Ruoyu, ???), exterior response and cooperation (Dewen and Ruoyu, ???).

Organizational conditions encompass innovation climate factors such as cross functional collaboration (Papastathopoulou, Avlonitis and Indounas, 2001), team characteristics (Menor, Tatikonda and Sampson, 2002), autonomy of employees (DeJong and Vermeulen, 2003), procedures and processes (Stevens and Dimitriadis, 2005), and continually leadership and cultural adaptation/change (Kjær and Bønnelycke, 2006). Centralization issues discussed are mainly role of top management, role of other departments, and formalization issues (e.g. Papastathopoulou, Avlonitis and Indounas, 2001).

Finally, external conditions related to market competitiveness is only mentioned by Stevens and Dimitriadis (2005), pointing to effects of competitors on the service innovation process. Regulations includes effects of legal and regulatory environment (Stevens and Dimitriadis, 2005; Ahn and Skudlark, 2002).

### **3.3.4. Service innovation outcomes**

26 (35 percent) of the contributions identified in the open literature search include some kind of discussion of innovation outcome. None of the articles had a pure descriptive character, but were typically positioned as effects of innovation process or

innovation types. Most of the articles focusing innovation outcome were empirical, and many of them had a quantitative approach studying effects of innovation processes and innovation conditions. The process studies and their effects on outcomes are discussed in chapter 3.3.2 while the condition studies are debated in chapter 3.3.3. Consequently, in this section, as in section 3.2.4, the performance outcome constructs and measures are highlighted.

The measures of outcome focused in the studies can be classified based on the same classification as is used in chapter 3.2.4.

- Service innovation effectiveness:  
 Process or type concepts and measures (Menor, Tatikonda and Sampson, 2002; Akamavi, 2004; Blazevic, Lievens and Klein, 2003; Lievens and Moenart, 2000; Pedersen, 2005; Luteberg, 2005)  
 Outcome concepts and measures (Matthing, Sandèn and Edvardsson, 2004; Froehle, Roth, Chase and Voss, 2000)
- Simple performance concepts and measures (performance of innovation versus performance of firm):  
 Simple firm performance concepts and measures (Van Ark, 2005; Olsen, 2006)  
 Simple categorization success/failure (Martin Jr. and Horne, 1993)
- Complex performance concepts and measures:  
 Components financial, non-financial, or both (Menor, Tatikonda and Sampson, 2002; Gounaris, Papastathopoulou and Avlonitis, 2003; Lievens and Moenaert, 2000; De Brentani, 2001; De Brentani, 1990; Leiponen, 2006; Van Riel, Lemmink and Ouwersloot, 2004; Lievens and Moenart, 2000; Avlonitis, Papastathopoulou, Gounaris, 2001 )

Service innovation effectiveness relate to improvements of the innovation process. As so, they do not focus improved performance or outcome for the company as a result of an innovation. Examples of variables used to measure service innovation effectiveness are costs, effectiveness and speed of the development process (Menor, Tatikonda and Sampson, 2002; Akamavi, 2005; Blazevic, Lievens and Klein, 2003), learning effects among project participants (Lievens and Moenart, 2000) and quality of the service development process. Among the outcome concepts used to measure innovation effectiveness we find concepts as degree of innovativeness (degree of originality) and

number of innovations and development of new ideas and services (Froehle, Roth, Chase and Voss, 2000).

Simple performance concepts are used only in a few of the reviewed studies. Van Ark (2005) relates service innovation to productivity growth in EU and US, while Olsen (2006) discusses effects of new service development characteristics on a perceived measure of profitability. Martin and Horne (1993) separate between successful and unsuccessful service innovations.

The most comprehensive part of the literature reviewed use complex measures of performance. None of the studies report pure financial outcomes, but financial outcomes are often used as a concept of measuring outcome together with other outcome variables. Examples of measures of financial outcome are company profitability, company costs, sale, market share (Menor, Tatikonda and Sampson, 2002; Avlonitis, Papastthopoulou, Gounaris, 2003; Lievens and Moenaert, 2000; De Brentani, 1990; Lin, 2005; Luteberg, 2005; Pedersen, 2005), achieved commercial objectives (Lievens and Moenaert, 2000), and revenue (De Brentani, 2001). Examples of non-financial concepts are perceived image, loyalty, new customers, competitive advantage (Avlonitis, Papastthopoulou, Gounaris, 2003), corporate reputation, cross selling, increase service delivery capacity, and competitive position (Lievens and Moenaert, 2000), amount of new service relative to competitors (Lin, 2005), and service quality, customer value, and adoption (Luteberg, 2005; Pedersen, 2005, Martin Jr. and Horne, 1993).

An interesting and alternative perspective is included by Rubalcaba (2004) who consider employment and skills as positive outcomes of the innovation process. Implicitly, he considers the development of skills and competence as an important outcome for future competitiveness of the service company. A somewhat alternative perspective to the three main categories listed above is also proposed by Van Riel, Lemmink and Ouwersloot (2004) who divide outcomes into short term outcomes (degree of success, value to other products and services, good idea to invest in), long term outcomes (commercial success, competitive position, brand equity and reputation, expansion into new markets, customer satisfaction and loyalty), and indirect outcomes (technology knowledge, employee satisfaction, and innovation opportunities). While short term outcomes focus constructs that can be measured relatively soon after the innovation launch, long term outcomes are only measurable

after a long period of time. The indirect outcomes reflect the possible increase in competence and satisfaction among company's employees that are considered to be a good investment for future competitiveness – in line with Rubalcaba's (2004) view.

## **4 Discussion of normative implications**

Two types of normative implications may be derived for service innovation methodologies from literature reviews of the type reported in section 3. One type is the implications from individual findings related to innovation processes, drivers, types and effects. For example, studies of service innovation processes may have found that some characteristics are more important to process results for NSD than for NPD, implying that service innovation methodologies should include these characteristics. In section 4.1, we summarize these implications for service innovation processes, drivers, types and effects. Another type of normative implications is the development of normative models of service innovation processes, drivers and types from these results by the authors having revealed these findings. Also, such normative models may be suggested from purely theoretical analyses, because conceptual contributions were also included in the review, we would expect such normative contributions to be identified as well. When looking at the list of contributions, however, very few conceptual contributions with direct normative implications could be identified. Thus, separate review of more conceptually driven normative models was conducted and the results of this review are reported in section 4.2.

### **4.1 Normative implications from empirical results**

In general, there are few normative recommendations highlighted in contributions found through the open literature search. In addition, the contributions from the open search vary along several dimensions, which actually make it a bit difficult to draw normative implications from them. First, the studies are conducted in various contexts, and seemingly normative implications based on one context is not necessarily transferable to other contexts. Consequently, conditions for innovation, innovation processes, and innovation types that may seem to work in one context may fail in other contexts. Furthermore, the result measures also vary across the studies and studies also shows that some conditions are positive for some result measures while other conditions have positive effects on other result measures. The two main categories of outcome studies are outcome related to the effectiveness of the process while the second category is outcomes related to market development, sale and profitability. Consequently, what seem to be important conditions for process effectiveness are not necessarily positive conditions for profitability and market shares. Given this contingency elements, the most important implication from the open search review

seems to be that future research should be clearer on classifying the contingency variables discussed in this section, and be more specific in theory development when it comes to measures and contexts. This will be necessary to draw normative implications for various service industries.

Despite the limitations of the material discussed in the sections above, we, nevertheless, do a few attempts to draw some normative conclusions for each of the four main categories of the theoretical framework.

#### **4.1.1. Service innovation types**

From the open search review, it looks like the four categories of service types used by DeJong et al (2003 – please see Figure 2.1) are a reasonable classification. A possible normative implication of this categorization is that innovations can arise in all parts of service companies' value chain. The categorization related to the source of the innovation (e.g. Den Hertog and Brouwer, 2000) indicate that innovations often arise at suppliers or other cooperating companies, or that service innovations are a function of cooperation between two or more companies. One normative implication may therefore be that an open relationship with other companies is a positive strategy for service innovation. We may also add organizational development, administrative development, and human resource development as an extra innovation type category (Tether, 2006; Herting, 2002). A normative implication may therefore be that service companies should create an organizational climate and/or structure that support innovation and invest in the development of human resources and knowledge.

The categories of service innovation types are very broad. An interesting observation from the review is that many of the articles discussing innovation types – in particular the categorization presented by DeJong et al (2003) - have a conceptual style, and is not conducted as empirical studies. For financial services, the degree of radical innovation seems to be the most studied categorization of service innovations (new to market, new to company, service extension, etc), while this is not focused in studies of other service contexts. It is of decisive importance for service companies to understand the service context the individual company operates in. What is a useful innovation in one service context may not be useful in other service contexts. Based on this, a more concrete categorization of potential service innovation types should be developed, and the categorization should be tested in various empirical contexts to reveal the

suitability of the categorization within various service contexts. An alternative approach to this problem has been applied by Econ (2005) focusing service activities rather than outputs and resources, and it will be interesting to see if any academic publications may be derived from this typology.

#### **4.1.2. Service innovation processes**

One rather unequivocal recommendation from the literature is to formalize service innovation processes to a higher degree than what is common today. Furthermore, recommendation to prioritize internal communication (Lievens, Moenart, and Jegers, 1999), interaction between various actors (internal and external) (Stevens and Dimitriais, 2004) and network models (Syson and Perks, 2004) again underline the importance of sharing ideas and information and cooperate with other actors, for example suppliers and customers. Regarding what kind of information and communication that should have priority, some recommendations are proposed normatively by Froehle and Roth (2006) for the various stages of the service development process. Alam and Perry (2002) also suggest what kind of activities that should be performed by customers in various service development stages. The spiral model may also be seen as a normative framework for how service development process should be carried out.

But again, the value of the normative suggestions is sensitive to variations in context. Many of the studies arguing for an increase in the formalization of the service innovation process are conceptual or have a general empirical foundation. Consequently, normative implication cannot be drawn to specific service sectors. It may for example be more important with a formalized service innovation process in larger service companies than in smaller service companies. It is therefore a need to scrutinize the usability of formal service development processes in various service sectors to reveal more nuanced knowledge about optimal level of formalization of the service development process in various service contexts.

The application of traditional service development processes – as included in figure 2.1 – is common in general empirical studies, in conceptual works, and in studies of financial services. However, there seems to be a need to find out more about potential benefits of following this development process in other services. Furthermore, the usage of alternative development processes as for example the spiral model or network

perspectives are typically of a conceptual character and need to be studied empirically, preferably within various service contexts.

#### **4.1.3. Service innovation conditions**

The review points to a large amount of service innovation conditions that potentially influence service innovation performance. Some of the studies focus on conditions for effective service innovation process while other studies focus on conditions' effects on service innovation efficiency. Most of the studies investigate direct effects, but some of the studies also look into more complicated models including mediating variables. Some of the normative implications that can be drawn seems to be that service organizations need an external climate that stimulate service innovation, internal and external communication and information exchange, top management support, and organizational characteristics to innovate effectively (increased sale, market share and profitability). Many of the same service innovation conditions are also found to be relevant drivers for effective service innovation processes. However, the importance of training, education, learning and human resource management may seem to be an additional condition with importance to achieve an effective service innovation process.

The split between conditions for service performance and effective service innovation process is important. The two dependent variables are often discussed in relation to the innovation paradox in product development literature, and illustrate the differences between drivers for innovation effectiveness (sale and profitability) and innovation efficiency (a good innovation process). For example shared mental models and a routinized innovation process are typically found to be positive for an efficient innovation process (Madhavan and Grover, 1998). This leads to few misunderstandings and a nice cooperation climate during the innovation process. However, shared mental models and routinized innovation processes do not necessarily lead to the most interesting and pioneering innovations and the effect of shared mental models and routinized innovation process may therefore not contribute to the most profitable innovations (Madhavan and Grover, 1998). This paradox is hardly discussed in the service development literature, and should be focused more in future studies. As is now, conditions for service development is related to process efficiency and output effectiveness more or less interchangeably, and this is not a satisfactory approach, given the innovation paradox.



Because of contextual differences in the studies reviewed, future research need to reveal a clearer picture of the validity of existing research for various types of service innovations. For example, organizational and administrative conditions are mainly focused in conceptual works and in empirical studies of the financial sector.

Furthermore, studies of the importance of understanding consumers and involve them in the development process is mainly conducted in a general context. More service sector specific studies on these issues should have priority in future research. The importance of internal and external communication and coordination is typically studied in financial services and in a general context. Also, many of the studies on characteristics of employees are of a conceptual and/or general character. Thus, more research is needed to get a more nuanced picture of the effects of various innovation conditions in various service sectors.

#### **4.1.4. Service innovation outcomes**

The open search review reveals a magnitude of output measures. They are related to innovation process efficiency, innovation effectiveness, and combinations of the two main categories of outcome measures. Both of the categories are important to measure. Service companies should strive to have both an efficient innovation process and to create effective innovations. However, because of the potential contradictory effects of some conditions on innovation effectiveness and innovation efficiency respectively, each and every service company have to be aware of this, and try to balance these contradictions in an optimal manner. The optimal balance will be a function of for example how radical the innovation is, what kind of service context the company belong to, and type of suppliers and customers. The majority of the outcome measures used in the studies reviewed is related to innovation effectiveness rather than to process efficiency.

#### **4.1.5. Consumer involvement, employees' knowledge, and communication**

One of the key to successful service innovation is knowledge about market needs. Consequently, knowledge of consumers' preferences and involvement of consumers in the development process should be a mandatory part of service innovation. Consumer involvement is focused by several authors (Pedersen, 2005; Stevens and Dimitriadis,

2005; Alam, 2002; Martin Jr. and Horne, 1993; 1995; Matthing, Sandèn and Edvardsson, 2004; Alam and Perry, 2002; Magnusson, 2003), underlining the importance of consumer involvement. Studies have found positive effects of consumer involvement on service innovation efficiency (Martin Jr and Hone, 1993) and Magnusson (2003) found that involvement of consumers was more beneficial than expert involvement in the service innovation process. This is also supported by Matthing, Sandèn and Edvardsson (2004). In their work, Alam and Perry (2002) and Alam (2002) present a framework discussing what kind of consumer involvement that should be performed in 10 stages of the service development process. The framework can be seen as normative. However, the framework is based on literature-review and in depth interviews with 12 companies in the financial/insurance sector. Although the framework is an excellent starting point for understanding the importance of consumer involvement, the framework needs a broader validation in specific service contexts. The framework may also be validated for its ability to support innovation process efficiency versus innovation outcome effectiveness.

Communication in the service development process is solidly studied by Lievens, Moenaert and Jegers (1999) and Lievens and Moenaert (1999) in the financial service sector. They make a split between internal communication and external communication. According to them, internal communication relate positively to reduction in uncertainty, a positive development project climate, and cooperation between development teams. It is particularly important with communication in the initial stage because the positive communication in the initial stage will be useful for the later stages of the development process as well. External communication relate positively to awareness among potential users and realistic expectations. They argue specifically for the importance of internal and external communication when the service innovation is characterized by high level of intangibility, simultaneity, heterogeneity, and perishability. The research is a source for normative guidelines for communication in the way that both internal and external communication is a vital factor for successful service innovation. However, the research is conducted among financial services and should be validated in other service sectors. Furthermore, we may ask whether internal communication is most important for process effectiveness or outcome efficiency. More knowledge should also be developed regarding the importance of communication in various stages of the service development process – both when it comes to types of communication and intensity of the communication.

Knowledge and learning are important in service innovation both when it comes to understanding the service and to enable an effective development process. Blazevic and Lievens (accessed 02.01.2007) propose that the effect of communication and organizational design on innovation performance is mediated by project learning. Also, personnel training and education is emphasized as major success factors for service innovation both by DeJong and Vermeulen (2003) and Menor, Tatikonda, and Sampson (2002). Karapidis, Kienle, and Schneider (2005) define learning as the process where qualification, skills, competencies, and working knowledge is built up while knowledge management is the conscious arrangement, organization and technologically-supported storage, distribution, and utilisation of knowledge. Normatively, it is not difficult to agree on the importance of a high level of- and relevant knowledge among the participant in service innovation. Furthermore, the normative recommendation of knowledge management is indisputable. However, again the context for service innovation must be emphasized. What is relevant knowledge and competence depends on the service sector or characteristics of the innovation. Furthermore, the relative importance of process knowledge versus innovation knowledge may depend on the complexity or the newness of the service innovation. Also, various types of knowledge and competencies may be more or less important in the various stages of a service innovation process. Although we recognize the importance of knowledge/learning and knowledge management as a normative recommendation, a lot of research remains to present a satisfactory level of nuanced and context specific normative recommendations.

## **4.2 Normative contributions**

The method applied to identify relevant contributions in section 3 mainly resulted in empirical studies of specific issues in service innovation and most of these were descriptive in orientation. Furthermore, the conceptual material identified in section 3 was also mainly descriptive. As shown in the previous section, descriptive material and empirical findings contribute significantly to normative models and recommendation for successful service innovation. Few of these studies, however, give any direct and normative recommendations for service innovation methodologies or tools. Any, such implications must be inferred from the findings and applied to modify a previously identified methodology. Typically, the basic methodology being modified in this way is traditional NPD methodology. This approach, however, suggests that service innovation does not differ from NPD in radical ways. As an

alternative, service innovation methods may be developed from scratch applying normative ideals or other normative principles. We did not expect the number of such contributions to be great, but found it important to our review to identify any such contributions.

PDMA-term	No	PDMA-term	No
Affinity Charting	0	Gap Analysis	40
Alpha Testing/Beta Testing/Gamma Testing	23	Hunting for Hunting Grounds	1
Analytical Hierarchy Process	14	Kaizen	48
Anticipatory Failure Determination	1	Lead Users	122
Attribute Testing	0	Modular Architecture	14
Balanced Scorecard	129	Morphological Analysis	13
Benchmarking	712	Nominal Group Process	0
Best Practice	607	Participatory Design	19
Brainstorming	174	Perceptual Mapping	9
Breadboard	3	Pipeline Management	4
Cognitive Modelling	1	Platform Roadmap	0
Concept Generation/Study/Screening/Testing	60	Process Mapping	43
Conjoint Analysis	61	Quality Function Deployment	90
Contextual Inquiry	4	Rapid Prototyping	46
Convergent/divergent Thinking	10	Roadmapping	151
Critical Success Factors	136	Scenario Analysis	29
Design to Cost	3	Six Sigma	60
Empathic Design	25	System Hierarchy Diagram	0
Ethnography	67	Technology Roadmap	12
Failure Mode Effects Analysis	0	TRIZ	22
Feasibility Determination/Study	91	Value Analysis	41
Focus Groups	292		

Table 4.1. Number of Scholar hits from terms in the PDMA Glossary combined with the terms “service innovation” or “new service design”.

To identify this type of contributions we tried to identify terms describing normative tools, methods, methodologies or techniques supporting innovation and product development in general. By combining such terms with the same terms as in the original review, we were likely to identify suggestions or applications of normative service innovation methodologies. The terms were identified using the Product Development and Management Association’s (PDMA) glossary of terms in new

product development ([www.pdma.org/library/glossary.html](http://www.pdma.org/library/glossary.html)). From this glossary, 43 terms were identified as having relevance to tools, methods, methodologies or techniques of NPD. The terms we used are shown in table 4.1.

The terms shown in table 4.1 was combined with the terms "new service development" and "service innovation" using scholar.google.com as the search engine. The number of hits for each search is shown in the second and fourth columns of table 4.1.

From the contributions identified with scholar.google.com we identified candidate contributions for further analysis applying the following procedure. Maximum 50 hits were investigated by reading through the source material of the contribution. From this reading, contributions published after 2000 that including normative elements were identified. The reason for focusing recent contributions was that digitization and online provisioning of services have changed the service innovation process and we were most interested in such contributions. A few exceptions were made for highly cited contributions published in 1998 and 1999. When applying these criteria, only 21 contributions were found relevant after adjusting for contributions applying the same methodologies. For example, three of the identified contributions that focused TRIZ-based methodology were appropriately represented by one comprehensive article (e.g. Chai, Zhang and Tan, 2005). The small number of contributions reflects the scarcity of methodological and normative material found in service innovation literature when compared to product innovation literature. Because this project was particularly focused on componentization at the time of the reporting, further search was conducted combining the terms "service innovation" and "new service development" with the terms "modularization" (49), "componentization" (1) and "decomposition" (108)<sup>1</sup>. From these hits, three additional contributions of normative relevance were identified resulting in a total of 23 contributions being reviewed. The resulting list of contributions and their characteristics are shown in appendix C. The contributions include 15 journal articles, 3 conference papers, 2 research reports, a book, a working paper and a master thesis.

The characterization of these contributions follows the framework applied in section 3. A new column, however, is added to characterize the contribution's appropriateness as a firm level service innovation system or architecture. From the review we find that 18

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<sup>1</sup> Figures correspond to the number of hits.

of the 23 contributions (78%) suggest normative implications to innovation process methodologies, 7 (30%) to innovation drivers, 14 (61%) to innovation type methodologies, 3 (13%) to innovation outcome methodologies (e.g. measurement) and 11 (48%) to innovation system or architecture methodologies.

One of the most often cited articles on new service development suggesting prescriptive implications for service innovation methodology is the work by Bidran and Pedrosa (1998) combining the principles of NPD methodologies with findings from the descriptive service development literature to suggest relevant NPD methodologies and modifications to these methodologies. They are also often cited as providing important ideas to the decomposition of services to enhance service innovation. Bidran and Pedrosa (1998) may be said to argue that most of the prescriptive NPD literature applies equally well to NSD. As we have shown above, however, extensive evidence now suggest that NPD differs from NSD, and that there are differences in NSD activities and processes across service industries. This suggests what Coombs and Miles (2000) terms a synthesis approach to service innovation should also be applied to normative methodologies. This implies that much may be applied from prescriptive NPD literature, but also that modifications are required as well as that specialized methodologies that primarily applies to service innovation should also be developed.

One way to do this is to apply, modify or develop specialized tools for service innovation. Examples of tool applications are found in Pahl, Farrukh and Probert (2004) and Wells et al. (2004) who shows how technology roadmapping tools may be applied to service innovation. An example of a specialized tool developed for service innovation is the application and discussion Holmlid (2004) does of a widely applied methodology in service innovation – service blueprinting. This methodology was originally developed by Shostack (1984) and several authors have published guidebooks applying the methodology (e.g. Kalakota and Robinson, 2003). Service blueprinting is a general methodology which may be implemented in several ways. The main objective of the methodology is to provide more formal descriptions of service processes through charts and maps. Consequently it is mainly used to dissect service processes to identify weaknesses and problems, and refined service processes based on service blueprinting consequently are mainly incremental service innovations. Moura a Sa and Sariva (2001) and Alonso-Rasgado, Thompson and Dannemark (2004) mainly suggest applying innovation tools from total quality

management literature. Also for these methodologies, the resulting innovations based on service quality improvements are of the incremental type.

Oke (2001) suggests a more comprehensive and controversial set of tools along the service innovation process as well as for new innovation types and the stimulation of specific service innovation drivers. Some of the contributions suggest specific tools or methodologies for specific innovation types. For example, Levy (2005) focuses mainly on methodologies for service innovations based on service decomposition. There is some doubt, however, in how the methodology should be adapted to less information intensive services than telecommunication and online services. Similarly, Lan (2004) suggests a set of methodologies for innovations based on digitization of services. The methodology, however, is also extended to include innovation system or architecture elements through an open innovation approach (Chesbrough, 2003). Lan's (2004) approach differs from Chesbrough's (2003) in focusing the possibilities of open innovation through the use of online tools only. Berry and Lampo (2000) suggest five innovation types by applying new principles of service redesign. No service redesign methodology is, however, presented. Berry et al. (2006) applies a similar approach in 2006 when they present a typology of service innovations by innovation types. Their typology differentiates separable from inseparable services and core benefits from delivery benefits to arrive at four different service innovation types. Again, however, no methodology for how to redesign or develop services of the four different types is provided. The innovation types are rather just suggested as ideas for potential service redesigns.

Comprehensive methodologies for so called product service systems innovations has also been proposed (Van Halen, Vezzoli and Wimmer, 2005). While the term intuitively could be interpreted as some form of bundled or encapsulated product/service offering (e.g. Howells, 2004), it is used to describe the replacing polluting product offerings with environmental friendly product/service bundles. Thus, the methodologies are often more focused on developing environmental friendly, clean or sustainable products than on adapting innovation methodologies to the characteristics of services. Still, the prescriptive literature (e.g. Van Halen, Vezzoli and Wimmer, 2005) provides comprehensive innovation architectures or systems that formalize product service system innovations.

Contributions are also found that suggest the stage gate linear process of prescriptive NPD-models do not apply to service innovations and should be replaced by non-linear models. For example, Berkhout and van der Duin (2006) suggest a cyclical model may better be applied for both descriptive and prescriptive purposes. Applying a cyclical model, they suggest, it is also easier to identify and implement innovations of intangible types, such as business model innovations. As such, cyclical innovation models may also be applied as a firm level service innovation system or architecture.

Some suggestions for methodologies are more theoretically driven. For example, using contingency theory or combining contingency theory and resource based theory, Tidd and Hull (2003) and Neu and Brown (2005) suggest typologies of service innovations where different innovation conditions require different innovation processes, give different innovation types, and thus, require different methodologies. By identifying best practices, Tidd and Hull (2003) identified differences in the optimal use of tools and methodologies for four different configurations of service innovation. Whereas the model is descriptive, as all contingency theoretical models it may also be used for normative purposes. A similar contingency model has also been developed by Bullinger, Fähnric and Meiren (2003) in which service innovation processes as well as optimal methodologies are believed to vary systematically by the contact intensity and the variety of the services being developed. The typology differentiates between high and low contact intensity and high and low variety of the service offerings being developed and suggest optimal methodologies should be adapted accordingly.

The most comprehensive innovation architecture or framework identified from the normative literature review is the literature on adapting and applying the theory of inventive problem solving (TRIZ) to service innovations. TRIZ was developed by systematic investigations of patents (e.g. Altshuller, 1997) to suggest methodologies for NPD. In a set of publications a group of researchers at the National University of Singapore (e.g. Chai, Zhang and Tan, 2005) has published several articles adapting TRIZ to service innovations. While TRIZ applies a linear stage gate approach to the innovation process, it is open for continuous iterations of a simple problem solving process. Supporting these simple steps is a set of principles and tools adapted from the original TRIZ methodology. For example, tools are provided in the open fuzzy front end of the problem solving/innovation process, and tools are provided by checklists and standard solutions identifying potential innovation types in the more closed problem resolution phase of the problem solving/innovation process. The



comprehensive set of tools offered by the TRIZ methodology makes it a promising innovation architecture or system for service providers accepting a more formal approach to improve their service innovation activities.



## 5 Conclusion and implications

In this report we have described the method and results of a literature review of service innovation and new service development literature. The purpose of the review was to summarize literature findings on service innovation that may be used to develop prescriptive implications for service innovation in both service and manufacturing firms. 107 conceptual and empirical articles or papers were identified from applying two search approaches of the service innovation literature. These contributions were carefully reviewed and relevant findings reported applying the general framework of DeJong et al. (2003). In addition, 23 articles or papers were identified from a search approach developed particularly to identify prescriptive literature on service innovations. A list of all contributions reviewed is shown in appendices A-C.

The conclusions that may be drawn from this literature review are of both descriptive and a prescriptive kinds. In the following we first summarize more descriptive findings as conclusions from the review and transform these next into more prescriptive implications. The framework of DeJong et al. (2003) applied throughout this report is applied as a structuring framework here as well.

### 5.1 Conclusions

#### *Service innovation type conclusions*

Several different categorizations or typologies have been identified. We found no support in our material for suggesting that service innovations are less radical than other innovation types, but much of the service innovation literature focus incremental innovations. We also found few contributions using service characteristics to develop service innovation typologies or discussing the effect of service characteristics on service innovation types. We did, however find considerable support for innovation types moderating the relationship between innovation conditions or innovation processes and innovation results. In particular, the idea that these relationships differ when the innovation type is radical versus incremental is generally supported. Also, the typology of service innovations used by Den Hertog (2000) may be used as a moderating variable for the effects of different innovation conditions and processes. The transformed Pavitt (1984) typology focusing the source of the innovation as a basis that was popular in the late nineties seems to have been given less attention

recently. The attention to service encapsulation (Howells, 2006) popular in the IBM service innovation initiative has been given more attention, but currently, no innovation typologies for this kind of innovations have been identified in our material.

### *Service innovation process conclusions*

Our findings seem to continue supporting previous findings that the service innovation process is more informal and that it is more difficult to identify stage-gate models being applied in service innovation processes. It also seems to be support for the importance of alternative sources information and innovation sources in service innovation when compared to product innovation. The closest we came to identifying a program of research in service innovation was the focus on the effects of customer involvement and customer orientation in service innovation. While this has also recently been focused in product innovation literature (e.g. Van Hippel, 2005), it seems to be even more important, but also more difficult, in service innovation. Services also seem to differ with respect to their innovation sources. While knowledge intensive service innovation sources are rather similar to the sources of high tech product innovation, other services differs considerably in the importance of e.g. institutional and R&D sources. This suggests that innovation sourcing may be context dependent suggesting different optimal innovation process models for different contexts (e.g. industries). Another topic investigated in many service innovation process studies is the importance of communication. Not surprisingly, communication is found to be very important, but this is generally believed to be the case for all types of innovations, so it is difficult to use this as a basis for suggesting service specific innovation process characteristics.

One of the problems with the explanatory service innovation process literature is that it focuses different outcome variables. Thus, findings that are relevant to innovation process quality may contradict findings that are relevant to for example, the financial results of service innovations. A few comprehensive explanatory models including service process variables were identified. Even though these were developed from studies of financial services they offer some of the more comprehensive frameworks for further systematic studies of service innovation. Attempts have also been made recently to map findings across service contexts into comprehensive models. One of the most interesting recent attempts has been published by Froehle and Roth (2006) suggesting a model of a four stage innovation process mapping three types of resources.

### *Service innovation condition conclusions*

The importance of human resources as a condition for service innovations is maintained by our findings. In particular the recent research program on KIBS has focused this resource, but the finding seem general to most service industries. Recent research also suggests that service innovation is more technology driven than before. In particular, the importance of information technology as a driver and tool of service innovation is found to be greater. A third resource that is believed to be important is network access and participation.

Among the most studied organizational conditions believed to be important to service innovation are innovation climate and centralization. While conflicting results are found for centralization, innovation climate is found to be very important. Among the external conditions studied, we identified market competitiveness and regulation, but there is no consistent program of service innovation research focusing external conditions. This is likely to be due to the general suggestion that institutional innovation sources are of less importance to service innovation than to product innovation.

### *Service innovation outcome conclusions*

Both search approaches revealed literature that differed greatly in the constructs investigated under the term of “innovation effects”. In particular the difference between effectiveness oriented constructs, in particular innovation process effectiveness, and firm performance constructs was obvious. It is also obvious from this that it is difficult to summarize outcome conclusions across such diverse “effects” constructs.

## **5.2 Implications**

As seen from section 4, few normative contributions directly focusing service innovations are found in the academic literature reviewed in this report. It is also difficult to derive implications from the descriptive and explanatory studies we have identified. Some of the reasons for this difficulty are that service innovation studies originate from and are conducted in different service industries and as such are context dependent. They are also placed in different traditions and based on different theoretical material. This makes them less comparable for example when it comes to

the effects studied, the process variables focused or the operationalization of variables. Many studies are also case-oriented with an internal validity rather than external validity as their main focus. To overcome this situation, we have suggested more program-oriented research on service innovation where researchers comparatively test more formal models and common operationalizations of constructs across different contexts.

Despite these difficulties, some implications have been suggested in section 4. In the following these may be summarized applying the framework of DeJong et al. (2003) in the following way.

#### *Service innovation type implications*

We find few directly prescriptive contributions that may be used to suggest that some innovation types are more relevant than others in service innovation. We did, however, find support for suggesting that innovation type should be considered when developing prescriptive models. In particular, categorizing the innovation type as incremental or radical may provide a basis for developing recommendations for optimal innovation conditions and processes. Due to the diversity of industries investigated in the service innovation literature and the diversity of innovation typologies stemming from this, alternative typologies that focus more on the service activity than on the service resources or outputs may be required to develop normative service innovation models based on service innovation types. In any case, service innovation type may be used as a classification variable for considering alternative innovation process support models and alternative service innovation tools, but currently, no such frameworks have been identified. However, some of the comprehensive explanatory frameworks identified, in particular from financial service industry studies, may be used as a basis for developing normative frameworks as well. For example, combining these frameworks with TRIZ-based existing normative framework may be a fruitful approach.

#### *Service innovation process implications*

Two alternative implications may be derived from the findings of low formality and few stage-gate model applications in service innovation. One is to suggest that more formalization represents a potential whereas the other would suggest that alternative prescriptive models must be applied to service innovation that incorporate this informality and lack of timely stage-gated process approaches. Some studies identified

have investigated this, and suggest that the first approach trying to apply more formalized approaches may be fruitful.

From the findings on innovation sourcing, we may suggest that customer involvement and customer oriented communication seem to be important. Some of the more operational implications of these findings are discussed in section 4.1.5. However, we have also revealed results suggesting that innovation sourcing should differ across industries. Due to differences in service contexts it is difficult to develop unconditional service innovation process models. Alternatives to stage-gated models have been proposed, but these are often less operational when seen from a managerial point of view. Attempts to develop more comprehensive frameworks based on stage-gate models have been made (e.g. Froehle and Roth, 2006), but currently, the service innovation researchers seem to be more occupied with unifying constructs and theories than prescriptive recommendations.

In the normative literature, general process frameworks applied from general strategy literature or from product innovation literature are applied. These mimic rational ideal models of decision making dominating prescriptive business strategy literature. Alternative approaches are found in more fragmented contributions suggesting particular tools, techniques and methodologies may be applied in the service innovation process. These approaches are valuable regardless of underlying service innovation process framework. Thus, identifying relevant tools, techniques and methodologies that may be transferred from product innovation literature to service innovation literature without transferring an underlying stage-gate process model seems a valuable approach to developing prescriptive service innovation guidelines.

#### *Service innovation condition implications*

Because knowledge resources, IT resources and network resources are believed to be fundamental to service innovations, these resources may be used as facilitators of service innovation. Few of the studies we have identified, suggest how this facilitation may be conducted but retain at documenting the importance of these resources in general. It is also likely that importance of these sources is likely to vary across service innovation types and their relevance to vary across different stages of the service innovation process. Still, developing and executing strategies to control these resources are believed to be an important implication. More operational is the finding that innovation climate is an important condition for service innovation. This suggests

mapping and monitoring the innovation climate of the innovating organization and network to be required. Several instruments have been developed for this monitoring (see e.g. Mathiesen et al., 2004). The importance of network access also suggests that some of the innovation types that have been developed in manufacturing industries at the network level rather than at the firm level may also be suggested for service industries. This is supported by recent findings that one of the main sources of service industry productivity growth is outsourcing and value chain decomposition and use of intermediate inputs (Triplett and Bosworth, 2003).

#### *Service innovation outcome implications*

Because it is difficult to generalize and conclude from our literature study across such diverse constructs as process quality, customer value effects and financial effects, we may suggest that service innovation research at least define two different outcome-related innovation research programs. One focusing process related effects and one focusing firm and network level performance effects. However, we have also identified literature suggesting comprehensive and operational and measures of firm and network level performance effects that may be applied in practical evaluation studies of service innovation activities. We suggest these may be applied in practical service innovation evaluation across most service industries.



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## **Appendices**

### Appendix A. Open search contributions

<b>Reference</b>	<b>Outlet</b>	<b>Classification 1</b>	<b>Classification 2</b>	<b>Process</b>	<b>Driver</b>	<b>Type</b>	<b>Performance</b>
John & Storey (1996)	Article	Non-empirical	Review	Several processes are discussed		Several categorizations of types are discussed	Several measures of performance are discussed
DeJong, Bruins, Dolfmsa & Meijard (2003)	Report	Non-empirical	Review	Search stage (idea, screening, evaluation) and implementation (development, testing, launch)	Factors related to NSD process, innovation climate, external conditions	Concept, interface, technology, delivery (incremental vs radical, new to firm vs sector, initiated by supplier vs client vs firm)	Financial, customer value, strategic success
Magnusson (2003)	Article	Empirical (quantitative)	Industry specific (Telia mobile)	Initiation, idea creation, delivery, evaluation			
Jones (1995)	Article	Empirical (quantitative and qualitative)	Industry specific (Flight catering)	NSD process related to NPD process			
Dolfmsa (2004)	Article	Non-empirical	Review	7 stages of NSD. From ad-hoc to formalization		Concept, interface, technology, delivery	
Martin Jr. & Horne (1993)	Article	Empirical (quantitative and qualitative)	General	Formalization vs ad-hoc process in	Formal innovation process, NSD		

Martin Jr. & Horne (1992)	Article	Empirical (qualitative)	General	NSD	strategy, fit of new service with current business, use of customer information, use of competitive imitation, involvement of champions in NSD		Level of consumer involvement, productivity, added value
Edgett & Parkinson (1994)	Article	Empirical (quantitative)	Industry specific (British building societies)		(Strategy, goals, programme to achieve goals)	Organizational, market research, market synergy, business/financial, launch effectiveness, formalization, market potential, design testing	
Lievens, Moenaert & Jegers (1999)	Article	Empirical (qualitative)	Industry specific (finance/bank)		Planning (up front predevelopment activities), development (design, development, testing), launch (pre-launch and launch)	Communication (internal and external)	
Gustafsson,	Article	Empirical (qualitative)	Industry specific			*Study consumers	

Ek Dahl & Edvardsson (1999)		(airline)		service usage to understand 1)needs and preferences, 2)service system, 3)values and cognitive structure, 4)behaviour, and 5)quality perception. *Use as input to NSD		
deBrentani (1993)	Article	Empirical (qualitative and quantitative)	Industry specific (business financial services)	1)Technical activities, 2)corporate environment, 3)quality of up-front activities, 4)quality of launch, 5)expert driven process, 6)supportive/involved corporate culture		
Menor, Tatikonda & Sampson (2002)	Article	Non-empirical	Conceptual	1)Design (formulation of new service strategy, idea generation and screening, concept development and testing), 2)Analysis (business analysis, project authorization), 3)Development (service design and testing, process and system design and testing, market program design	1)Technology, 2)Systems, and 3)People	1)NSD outcome (financial, competitive and quality measures) and 2)NSD process (criterion cost, effectiveness and speed) (underpunkter på alle disse)

Syson & Perks (2004)	Article	Empirical (qualitative)	Industry specific (Building society)	and testing, personnel training, service testing and pilot run, test marketing), and 4)Full launch (full-scale launch, post launch review)		
				A network perspective on the development process. Network is related to product development team. Perspektivets hensiktsmessighet relatert til intangibility, perishability, inseparability and heterogeneity		
Papastathopoulou, Avlonitis & Indounas (2001)	Article	Empirical (quantitative)	Industry specific (banking)	Initial stages of the NSD process (formulation of new SD strategy, exploration of market problems and needs, idea generation, idea screening, concept development, concept testing, business analysis)	Suggestions for new thinking about internal context (organizational structure, role of departments and top management, formalization)	

Oke (2003)	Article		General (financial and insurance, retail, transport, telecom)	New product strategy, idea generation, screening and evaluation, business analysis, development, testing, commercialization	Testing, motivating employees, generation of ideas, lack of service innovation legacy, management support, services are easily copied, patenting, effective NSD process, good service innovation measures		
Hertog & Bilderbeek (1999)	Report	Non-empirical (conceptual)				Concept, interface, technology, delivery (see appendix A1-4)	See Appendix C (Measures for Transport, Wholesale, Retailing, Finance, Temporary staffing industry, Technical engineering)
Maffei, Mager, Sangiorgi (2005)	Note (Conference?)	Non-empirical (Conceptual)			Company, competitors, suppliers, customers (lack of support for trade and internationalization, difficulty in valuing and financial intangible service assets, adequacy of intellectual property protection, lack of government support,		



Abeck, Link, Mayerl, Mehl & Vogel (????)	Note	Non-empirical		Process for IT service development (Create service template, create service module template, input attribute values to service module template, create service module catalog, assemble service, create service catalog)	distance from innovation systems)		
Zhang, Tan & Chai (2003)	Note	Empirical (method for NSD called TRIZ – Qualitative case study)		1.Problem identification, 2.preliminary problem analysis, 3.problem modelling and formulation, 4.contradiction analysis, 5.contradiction elimination, 6.solution evaluation, 7.solution selection			
Simmons & Bouwman (2005)	Article	Empirical (qualitative case study)  Compares design methods: 1)QFD, 2)Blueprinting & line of visibility,	General (network equipment manufacturer, tele-operators and retail,	Clarifying objectives, establishing functions, setting	Customer orientation, channel coherence, channel synergy, fit with supplier		

Papazoglou & Heuvel (????)	Note	3)Service system planning, 4)Service concept definition, 5)Fundamental engineering  Non-empirical	large travel companies, office supplies wholesaler, large banks)	requirements, determining characteristics, generating alternatives, evaluating alternatives, improving details	marketing strategy, speed, focused design process, communication in development team, communication of concept coherence during implementation	
Bullinger, Fänrich & Meiren (????)	Working paper	Non-empirical		<p>1)Planning (gap analysis, scenario analysis, planning), 2)Analysis and design (service analysis and design, service specification, process identification, process specification), 3)Realization, 4)Deployment, 5)Execution</p> <p>1. Waterfall models (linear progression of the process – flex: Idea generation, Requirement</p>	Development strategies, organizational design aspects, human resource management, IT	Four types of services related to 1)contact intensity employees and customers (high vs low) and

				analysis, Concept development, Implementation, Market launch, Post-launch review) and 2.Spiral models (iterative models where the steps in the linear models are repeated several times)	support	2)Variety – the total number of determined manifestations of the service (high vs low)	
Dewn & Ruoyu (???)	Working paper	Non-empirical		Search (idea generation, screening, evaluation) and Implement (development, testing, launch)	Personnel, resources, organization, network supports, superintendent		
Karapidis, Kienle, Schneider (2005)	Conference paper	Empirical (qualitative)	General	3 parallel processes: 1)Creativity, 2)Learning, 3)Knowledge management (each of the 3 processes are explored more deeply)	Communication, coordination, cooperation		
Froehle & Roth (2006)	Working paper	Empirical (qualitative)	General (finance, healthcare, education, media/communication, food, pharmaceutical, utility)	Design, analysis, development, launch (more specified on each stage)	Intellectual resources, organizational resources, physical resources (more specified for each of the resources)		
	Article						

Ahn & Skudlark (2002)	Article	Empirical (qualitative)	Industry specific (telecom)	Idea generation, concept assessment, feasibility, requirements, development and testing, deployment	Technological development, deregulation and policy, management and competition		
Stevens & Dimitradis (2005)	Article	Empirical (quantitative)	General (Bank and Retailer)	Learning process: Dissonance, interpretation, test, adoption, adaptation	Individuals, groups, organization, infrastructure, external environment	New to market, new to company, new delivery process, service modification, service line extension, service repositioning	Overall performance (perceived image, consumer loyalty, profitability of other company products, new customers, competitive advantages), financial performance (profit, sale, market share)
Gounaris, Papastathopoulou & Avlonitis (2003)			Industry specific (financial services)	1)Idea generation and screening, 2)business analysis and marketing strategy, 3)technical development, 4)testing, 5)launching			
Alam & Perry (2002)	Article	Empirical (qualitative)	Industry specific (financial services)	Strategic planning (8), idea generation (1), idea screening (2), business analysis	Activities/input from consumers in each of the 10 stages		

Akamavi (2004)	Article	Empirical (qualitative)	<p>(6), formation of cross-functional teams (3), service design and process/system design (4), personnel training (9), service testing and pilot run (7), test marketing (10), commercialization (5) (Tallene viser fasenes viktighet)</p> <p>Ser også på parallele versus sekvensielle prosesser</p> <p>Innovation process modelled as a flow-chart.</p> <p>1. Flow-chart as is, 2. Flow-chart with potential problems marked, 3. Revised Flow chart, 4. Flow-chart for service adapted for e-service</p> <p>1. Front end of service innovation (Targeted ideation,</p>	<p>(6), formation of cross-functional teams (3), service design and process/system design (4), personnel training (9), service testing and pilot run (7), test marketing (10), commercialization (5) (Tallene viser fasenes viktighet)</p> <p>Ser også på parallele versus sekvensielle prosesser</p> <p>Innovation process modelled as a flow-chart.</p> <p>1. Flow-chart as is, 2. Flow-chart with potential problems marked, 3. Revised Flow chart, 4. Flow-chart for service adapted for e-service</p> <p>1. Front end of service innovation (Targeted ideation,</p>		<p>Many measures of process improvements (page 45): Examples are; lead time, responsiveness, paper usage, empowerment of consumer, costs of promotion, costs of transaction, etc.</p>
SAP	Note	Non-empirical	<p>Industry specific (financial service – the process of opening an account)</p> <p>Industry specific (Telecom)</p>			



Kjær & Bønnelycke (2006)	Article	Non-empirical	Insurance	<p>innovation, revenue logic, marketing &amp; sale, implementation and support, feasibility study, service concept.</p> <p><b>3. Teknologi støtte</b> – value innovation, enabling technology, technology development, prototype, piloting, service concept.</p> <p><b>1</b> Ideskabelse, <b>2</b> Markedsanalyser, <b>3a</b> Modning og kommersialisering av konsepter, <b>3b</b> Prosjektutvikling, finansiering og implementering, <b>3c</b> monitorering, Business case (3a, b, og c skal skje parallelt)</p>	Kontinuerlig ledelse og kulturell forandring		
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Reference	Outlet	Classification1	Classification 2	Process	Driver	Type	Performance
Cowell (1988)	Article	Non-empirical	Conceptual	Idea generation, idea screening, concept development and testing, business analysis,			

De Jong & Vermeulen (2003)	Article	Literature review	Conceptual	development, testing, commercializing	<p><b>1. Managing key activities</b> A)<i>People</i>: Involvement of frontline employees, presence of product champions, management support) and B)<i>Structure</i>: Funnel tools, multifunctional teams, availability of resources, pre-launch testing, market research and launch</p> <p><b>2. Creating an innovative climate</b> A)<i>People</i>: External contacts, sharing information, autonomy of employees and B)<i>Structure</i>: Strategic focus, training and education, internal organization and</p>		
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Martin Jr. & Horne (1995)	Article	Empirical (qualitative and quantitative)	General	Idea generation, business evaluation, marketing plan preparation (de avgrenser studien til disse tre trinnene)	task rotation, IT	Most successful versus least successful
Edvardsson, Haglund & Mattsson (1995)	Article	Empirical (qualitative)	General (finance, telecom, transport	Idea phase, formation phase, design phase, implementation phase	Lack of information about specifications and goals, uncertainty about who the sponsor is, difficulties in dividing responsibilities and allocating resources for the projects, lack of systematic reporting and documentation and feedback, lack of market information during the development process.	
Den Hertog, Broersma & van Ark (2003)	Article	Non-empirical	Conceptual (focus on retailing, transport/logistic, finance, IT, Technical		1. Service concept, client interface, service delivery system, technological	

Van de Kar (2004)	Rapport (dr avhandling)		engineering	Anvender spiralmodellen som tilnærming til innovasjon av mobile informasjons-tjenester. Opprinnelig publisert av Boehm (1988)		options	2. Supplier dominated, innovation in service, client led innovation, innovation through service, pragmatic innovations
Boehm (1988)	Artikkel	Non-empirical	Modellen er opprinnelig utviklet til å støtte utviklingsprosesser for software	Spiralmodellen (objectives, constraints, alternatives, risks, risk resolution, risk resolution results, plan for next phase, commitment)			
Eberlain & Halsall (????)	Article/Conference ???	Non-empirical	Conceptual	3-dimensjonal utviklingsmodell for telekommunikasjonstjeneste			

Lievens & Moenaert (2000)	Article	Empirical (Quantitative)	Industry specific (financial service)	<p>1)<b>Completeness</b> (normal behaviour, parallel behaviour, exceptional behaviour, overall behaviour),</p> <p>2)<b>Refinement</b> (service level, service level, service independent building blocks level)</p> <p>3)<b>Formality</b> (informality, functionality &amp; topic &amp; goal&amp; information &amp; implementation constraint, textual use case, structured use case, formalized use case, service definition template)</p> <p>Tilsvarende studie som referert til overfor i denne tabellen av samme forfattere</p>	Activity performed by		
Alam (2002)	Article	Empirical (qualitative)	Industry specific (financial services)	Strategic planning, idea			

De Brentani (1990)	Article	Empirical (quantitative)	General	generation, idea screening, business analysis, formation of cross functional teams, service design and process/system design, personnel training, service testing and pilot run, test marketing, commercial- ization	producers listed in each phase and activity performed by user listed for each stage (purpose of involvement, stages of involvement, intensity of involvement, modes of involvement)		Sales performance (med 6 underpunkter), Competitive performance (med 4 underpunkter), Cost performance (med 3 underpunkter) og Other boosters (med 2 underpunkter)
Froehle, Roth, Chase & Voss (2000)	Article	Empirical (quantitative)	General	Black box	Cross functional teams, Integration of IT, formalization of		Number of innovations and development of new ideas and

Blazevic & Lievens (????)	Working paper	Empirical (quantitative)	Industry specific (Banking)		the NSD process, speed of executing NSD Project learning	services
Lievens & Moenart (2000)	Article	Empirical (Quantitative)	Industry specific (Bank)	Black box	<b>Organizational antecedents</b> (complexity, formalization, centralization project climate) påvirker <b>communication type</b> (intra og extra project communication) som reduserer <b>innovative uncertainty</b> about (customers, competitors, technologies, resources) som igjen påvirker <b>project performance</b>	Corporate reputation, competitive position, cost position, cross selling, service delivery Project performance (financial performance, learning effects, technological performance)
Howells (2006)	Conference paper	Non-empirical	Illustrative (Opinion)			Product/Services, means of production, means of

								delivery, technologies used, skills used, organizational structure, customer interrelationship, other interrelationships	
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Reference	Outlet	Classification 1	Classification 2	Process	Driver	Type	Performance
Jankowski & Tassey (2005)	Report	Empirical (qualitative)	General part and specifcly on Telecom, Financial services, Systems integration (Software), Research	Generell og for Network operators, Finance, System integration, and Research (detaljerte prosess-beskrivelser			
Den Hertog & Brouwer (2000)	Report	Empirical (quantitative)			Mange (se tabell 15, side 21).	1)New service concept, 2)new client interface, 3)new service delivery system, 4)technological options (en rekke mer konkrete eksempler gis innen hver av de fire hovedkategoriene)  1)supplier dominated, 2)innovation in service, 3)client led innovation, 4)innovation	

Lee, Shim, Jeong, & Hwang (2002)	Report (se side 151) (Marianne Broch, Helge Klitzing, Kjersti Wolneberg, Svend Remoe, Jon Hekland)	Empirical (quantitative)	KISA				through services, 5)paradigmatic innovations	
						Innovative effort from all parts of the firm, R&D, core skilled manpower, cooperation between internal and external parts, R&D planning and marketing, high quality administration, marketing suitable to users needs, providing consumers with good A/S and education  Måter som KISA kan bidra til tjeneste-innovasjon på (se s. 86)	1)innovation – service provision – use of service, 2)service offer – service contract – problem identification – innovation – problem solution – use of new service, 3)Service offer – service provision – innovation (se s. 84)	
Avlonitis, Pastathopoulou & Gounaris (???)	Working paper	Empirical (quantitative)	Industry specific (financial services)	Idea generation and screening, business analysis and marketing strategy activities, technical development activities, testing activities, launching activities (fasene er operasjonalisert)	1. Formalitet (systematic behaviour, documentation, assignment of responsibilities) (også disse er operasjonalisert) og 2. Cross-functional involvement i	New to the market, new to the company, new delivery process, service modification, service line extension, service repositionings	1. Financial (seks underpunkter) og 2. non-financial (fem underpunkter)	

Lin (2005)	Rapport (Master thesis)	Empirical (quantitative)	General			hver av fasene Inseparability, heterogeneity, perishability and market orientation (uavhengige variabler) påvirker innovation resources og innovation reward (mediating variables) og derigjennom NSD Performance (avhengig variabel)	Achievement of pre-set objectives, market share, sales, profit, amount of new service relative to competitors
Luteberg (2005)	Report	Empirical (quantitative)	General			<b>Innovation process characteristics</b> (stage of involvement, intensity of involvement, customer characteristics) and <b>form of innovation</b> (innovativeness and type of innovation (service versus process innovation))  Intangibility,	Process quality, customer value, market performance, profitability



Pedersen (2005)	Report	Empirical (quantitative)	General		heterogeneity, inseparability, perishability, information intensity proposed to influence innovation process and form of innovation. Moderating effects of these service characteristics are also postulated.			Process quality, service quality, customer value, adoption, financial results
					<b>Innovation process</b> (formality, centrality, professionalism, cooperation, customer orientation, resource demands, development time and – frequency, project synergy) and <b>innovation type</b> (standardization, explicitness, service combinations, co-production, innovativeness, innovation synergies,			

Olsen (2006)	Report	Empirical (quantitative)	Industry specific (hotels)		resource base, innovation quality, customization, segmentization. <b>Service characteristics</b> (intangibility, inseparability, perishability, heterogeneity, information intensity).  Innovation process and innovation type proposed to influence performance. Service characteristics proposed to influence innovation process and innovation type and to moderate their effects on performance.			Profitability (subjectively measured (7 point scale from weaker profitability – much better profitability)
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Van Ark (2005)	Working paper	Empirical (quantitative)	General			mediating variables - profitability	Supplier dominated innovation, innovation in service, customer led innovations, innovation through service	Productivity growth in EU and US
Rubalcaba (2004)	Working paper	Non-empirical	(Review)			Internal, users, external, innovation and R&D policies, economics and financial costs and risks, intra firm obstacles, expertise and skills, appropriate rights and IPR, client expectations and needs, market competition and imitation, regulations and burdens	Technological, organizational, strategic, and commercial, and operational innovations.  Supplier led, client-led, innovation in services companies, innovation through services, innovation through paradigmatic changes	Costs and productivity, market expansion, employment and skills, quality, social impacts, outsourcing, networking
Herting (2002)	Working paper	Empirical (quantitative)	Industry specific (hospitality)				Technical innovations, administrative innovations, human resource innovations, product/service innovations	
Timbrell, Koller	Working paper	Non-empirical	General	Four parallele				

& Lindstaedt (???)		(conceptual)		<p>business processes:  1) Sales (Marketing, qualifying, proposing, delivering), 2) R&amp;D (designing, planning, development, evaluation), 3) Manufacturing (Initiation, production, testing, delivering), 4) Service delivery (notify incident/request, assign problem/change, Solve problem/change request, remove incident/Request).</p> <p>Main point:  Knowledge must flow within and across the four business processes</p>				Tether (2004)	Working paper	Empirical (quantitative)	General		1. Skills and professionalism of the workforce, 2. Co-operation practices with customers, suppliers or the trade associations, 3. Flexibility or adaptability of	Declared innovation orientation of service firms (based on Innobarometer, 2002): New service (34%), new production processes (24%), organizational	Declared innovation orientation of service firms (based on Innobarometer, 2002): New service (34%), new production processes (24%), organizational
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					production to market needs, 4. Leadership in market trends, 5. Technological advanced and/or R&D, 6. Having efficient production methods.	changes (53%), and None/don't know (12)	changes (53%), and None/don't know (12)	(brukes vel egentlig som performance mål også – side 15)
Omppula (2001)	Conference paper	Empirical (qualitative)	Industry specific (tourism: nature-based activity operators)	1. Service concept development (idea generation for the core product, core product screening, concept testing (internal), concept development), 2. Service process development (module creation and development, service blueprinting, prototype testing (internal), business analysis, formal product blueprint), Market testing (product testing (external), financial evaluation, 4. Commercialization (formal product offering/presentation of the product), 5. Postintroduction evaluation.	1) Existing market/existing service, 2) Existing market/new service, 3) New market existing service, 4) New market/New service			
CRIC Briefing (no 2, 2006)	Briefing	Non-empirical (opinion)	Industry specific (Airlines)			Services as a support for gods:		

							1. Monitoring and diagnostic services, 2. Purchase finance and leasing facilities/delivery, 3. Purchase and operation of related support activities/expert advice & consultancy, 4. Retrofitting and updating, 5. Repurchase, disposal and recycling, 6. Maintenance and repair.	
Kamiouchina, Victorino and Verma (2006)	Article	Oppsummerende artikkel fra 2 <sup>nd</sup> annual product and service innovation conference. Cross disciplinary focus. Piker på status que og focus for fremtidig forskning.						
Laine, Paranko, Varila, & Soumala (???)	Working paper	Empirical observations	Industry specific (Original Equipment Manufacturer)	1. Recognition of a business opportunity, 2. The development phase, 3. The commercialization			1. New new services to current customers, 2. new services to new customers,	

				<p>phase, 4. The sale phase, 5. The usage phase begins, 6. Life-cycle supporting customer's processes.</p> <p>The phases are supposed to be parallel</p> <p>1. Innovator capabilities/desires (three first phases), 2. Distribution network capabilities/desires (all of the six phases), 3. End customer capabilities/desires (three last phases)</p>		<p>3. current services to current customers, 4. current services to new customers</p>	
Laine, Paranko, Varila, Soumala (2005)	Conference paper	Empirical observations	Industry specific (Original Equipment Manufacturer)	<p>1. Recognition of a business opportunity, 2. The development phase, 3. The commercialization phase, 4. The sale phase, 5. The usage phase begins, 6. Life-cycle supporting customer's processes.</p> <p>The phases are supposed to be parallel</p>		<p>1. incremental change to customer and radical to innovator, 2. radical change to customer and radical to innovator, 3. incremental change to customer and incremental to innovator, 4. radical change to customer and incremental to</p>	

					1. Innovator capabilities/desires (three first phases), 2. Distribution network capabilities/desires (all of the six phases), 3. End customer capabilities/desires (three last phases)			innovator	
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## Appendix B. Journal search contributions

Reference	Outlet	Classification 1	Classification 2	Process	Driver	Type	Performance
Berry & Lampo, 2000	Article, redesign	Non-empirical	Conceptual			Suggesting 5 service innovation types based on service redesign: Self-service – customer assumes role of producer Direct service – service delivered at customers location Pre-service-streamlines activation of service Bundled service – combines multiple services into a package Physical service – manipulation of tangibles associated with the service	
Froehle et al., 2000	Article, antecedents of NSD effectiveness	Empirical	General (12 industries)	Mediating variable was NSD speed	Determinants of NSD effectiveness: Team implementation IT use Formalization of NSD process Support for both		Measures the effects on NSD effectiveness. Measured as number of innovations and development of new ideas and services

Lievens and Moenaert, 2000	Article, new service teams	Empirical	Industry specific (financial services)	Uncertainty reduction as mediating variable (customers, competitors, technologies and resources). General support for model	direct and mediating effects. Determinants of NSD success through communication: Complexity, formalization, centralization and project climate	Measures NSD success as three dimensions of financial performance, learning effects and technological success
Magnusson, Matthing, and Kristensson, 2003	Article, service innovation	Empirical	Industry specific (telecom services)	Customer involvement in service innovation processes. Types of users involved: Professional, ordinary users and consulting users		Measures NSD effects as originality, user value, and producibility
Hul, 2004	Article, innovation strategy	Empirical	General (62 large product enterprises)	Considers early involvement, process formalization and ICT use as interacting process attributes affecting performance. Studies the moderating effect of explicit NSD/innovation strategy and rapid changes in services on performance.	Studies service innovation types as personal versus transactional	Measures NSD effects as NSD process outcomes (shorter time, reduced costs of NSD, new features)
Chai, Zhang and Tan, 2005	Article, new service design	Mainly conceptual, two case studies	General	Suggests formal procedure for service innovations	TRIZ method identifies particular	

				based on TRIZ. Partly validated in two case studies. TRIZ method adds tools and techniques to structure process.		innovation types (40 principles and 76 standard solutions)	
Edvardsson, Enquist and Johnston, 2005	Article, cocreating	Mainly conceptual (one case study, IKEA)	General, but case is consumer services	Suggest the concept of “experience room” as a means to involve customers in co-creation. Focus on integrating service dimensions with tangible products		Case is restricted to services closely integrated with tangibles (product-service innovations)	
McCabe, 2000	Article, innovating	Empirical (four case studies)	Industry specific (financial services)	Discuss enabling and disabling processes of organizational innovation in service firms and identifies these as barriers towards genuine innovation		Focuses organizational innovations	
Storey and Kelley, 2001	Article, new service development	Empirical	General	Descriptive survey. Processes described under activity and strategy. Four types of NSD strategies identified. Summary on p. 87-88 lists conclusions.			Describes NSD performance at the program and individual project level. Identify financial, customer and internal measures of NSD performance. Loosely investigates relationship between NSD

Szmigin and Carrigan, 2001	Article, innovator	Empirical	Industry specific (leisure and tourism services)			Suggest and show that innovativeness does not decay by the age of the consumer. Suggests the involvement of older consumers in service innovations of service niches.		strategy and performance measures.
Verneulen and Dankbaar, 2002	Article, product innovation	Empirical	Industry specific (financial services)	True multidisciplinary projects are seldom. Customer involvement is rare. Mainly non-parallel processes. Communication at the interface between marketing and IT				
Czarnitzki and Spielkamp, 2003	Article,	Empirical	Industry specific (business services)			Due to knowledge intensity business services are seen as innovation bridges “feeding” other product and service forms with knowledge, ideas and external information. Interaction with		

Johne and Harborne, 2003	Article, new service development	Empirical, (19 case studies)	Industry specific (financial services)	Three process characteristics are found to cause NSD success – communicative, participating and enabling leadership style	such players may be seen as a determinant of innovation.	Cases divided into success and failure projects. Criteria for NSD success not explicit.
Howells, 2004	Article, innovation	Conceptual	General		Describes service encapsulation as a service innovation type. Several forms of service encapsulation are suggested as well as alternative aims of encapsulation	
Urritiaguer, 2004	Article, innovations	Empirical	Industry specific (theatres)	Discusses the effects of artist versus professional theatre managers on innovativeness, and shows that professional managers are more innovative. When controlled for organizational variables, however (budget responsibilities) the picture conclusion	Knowledge resources of management seen as determinant of innovation	Innovativeness measured as contemporary plays

Abramovici, and Bancel-Charensol, 2004	Article, service innovation	Empirical (3 case studies)	Industry specific (mass industrialized “services”)	<p>may not be retained</p> <p>Discusses customer considerations for industrialized “services”. Suggests guidelines for customer considerations in stages of the innovation process.</p>			
Toivonen, 2004	Article, foresight	Mainly conceptual (one “case” study)	Industry specific (KIBS)	<p>Discusses the appropriateness of formal foresight methodology in service innovation. Suggests alterations in the traditional foresight methodology when applied to services.</p>	Focuses KIBS-related innovation types		
Ramirez, 2004	Article, innovation	Empirical (one case study)	Industry specific (telecom)	<p>Ease of use requirements makes user involvements and joint user/firm learning cycles important to NSD. Customer support involvement may take a role as representatives of the joint learning process.</p>			Investigates adoption and perceived user friendliness as attributes of successful NSD
Cainelli, Evangelista and Savona, 2004	Article, innovation	Empirical	General		Innovation types involving the adoption and use of ICT are the ones contributing most to performance		Economic performance depends on amount spent on innovation and innovation types

Bryson and Mommyer, 2004	Article, innovation	Conceptual (review-like)	General		Driver suggested in an equation consisting of invention, entrepreneurship, integrity, management, collaboration, culture, competitors, customers, external conditions, environment and coincidence	Suggest the multitude of innovation types in services creates measurement problems	
Nicholls, 2004	Article, new product development	Empirical (informal case studies)	Industry specific (retail)			Suggest framework for innovation types in fair trade products	
Liden and Sanden, 2004	Article, service development	Empirical	General	Service guarantees is suggested as a means for pricing and service failure and stimulating service development by “invoked cost reductions”			
Carvalho Vieira et al. 2004	Article, new services	Empirical	Industry specific (financial services)	Strategic factors in model include <i>global quality</i> , communication consistence, <i>innovativeness</i> , <i>relative advantage</i> , <i>NSD process</i> , cycle time, <i>management synergies</i> , innovation strategy	Article sets up a framework of two factors influencing NSD performance – strategic and environmental. Strategic relates to process and type, environmental to		NSD performance measured multidimensional construct including financial, time to break even, relationship enhancement and market

				and corporate image. Significant factors in italics.	conditions. Environmental are market competitiveness and regulation (forecast). Framework on p.94		development. Strategic factors vary by NSD measure component.
Perks and Riihela, 2004	Article, new service development	Empirical (two case studies)	Industry specific (postal service)	Investigates the effects of inter-functional integration in NSD processes. Complex set of findings, but to generalize they seem to imply that formalization of NSD process improves outcomes when there is high inter-functionality. Such formalization includes communication tools, structured hierarchy of authority and protection from disruptive contexts.		Qualitative method involves multiple measures of NSD outcomes including task and psycho-social outcomes	
Wong and He, 2005	Article, innovation	Empirical (CIS-like data from Asia)	Industry specific (KIBS)	Compares KIBS to manufacturing. KIBS less likely to have overseas partners in innovation.	KIBS use more resources on human capital and training innovation. Social capital important to KIBS innovation	Focus on characteristics of innovation rather than NSD outcome.	
Camacho and Rodríguez, 2005	Article, innovative	Empirical (CIS-data)	General	Differences in processes identified	Uses CIS data to classify industry	Outcome only in the sense of	



Wood, 2005	Article, innovation	Conceptual (some review)	General	between highly innovative and others. Details in article	sectors, high, medium, low innovativeness.	identified between highly innovative and others. Details in article.	innovativeness in CIS
Vermeulen et al., 2005	Article, new product introductions	Empirical	General	Seven determinants related to process: <i>Innovation part of strategy, documentation of renewal/innovation, use of external networks, market research, cooperation, employee involvement</i> and employee training. General significant in product introductions, not form performance in italics. Large sector differences.	Some of the determinants may be conditions and may be placed here. Uses service sector (Miozzo and Soete) as moderating variable. Model on p. 628.		Interested in the effects of NSD on firm performance (sales growth and number of employees).
Djellal and Galloui, 2006	Article, innovation	Conceptual	Industry specific (health care)			Innovative framework that suggests replacing	

Song, di Benedetto and Song, 2000	Article, new service development	Empirical	General			<p>process/product innovation with innovation targets. These are seen from a systemic perspective and include horizontal and vertical innovation types. Horizontal innovations are across traditional barriers of the health care system, vertical along the traditional barriers. Combinations may be systemic, but this term is not used. Framework may add normative value.</p>	<p>Investigates pioneering advantages as perceived by service firm managers. Service managers distinguish market share from profitability effects of</p>
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de Brentani, 2001	Article, new business services	Empirical	General	Formal NSD process global factor.	Global drivers: Customer knowledge Competent front line Formal NSD process Incremental drivers: Strategy/ fit Systemic approach Cost/complexity considerations Radical drivers: Tangible evidence Ensure market potential	Really “new” versus incremental innovations seen as different types of innovations with different conditions and processes	pioneering No explicit firm outcome or NSD outcome investigations
Meyer and DeTore, 2001	Article, developing new services	Mainly conceptual (one case)	General (industry specific case, insurance)			Suggest service innovations from creating components and shows through a case how these may be combined to create new services. No methodology as such, mainly principles and an example. Illustrative figures may be applied as method.	
Avlonitis, Papastathopoulou	Article, new financial services	Empirical	Industry specific (financial)	Process characteristics for		Innovativeness used as a driver	NSD outcomes/ performance

and Gounaris, 2001			services)	each degree of innovativeness, thus for reach innovation type: NSP process activities, NSD process formality, cross-functional involvement. Find support for differences across process characteristics for the six types of innovations. Summary on p. 48 in prepublication issue.		or discriminating factor with the following types: New to the market services, new to the company services, new delivery process, service modifications, service line extensions, service repositionings	measured by eleven items reflecting two dimensions: Financial and non-financial outcomes.
Van Riel, Lemmink and Ouwersloot, 2004	Article, service innovation	Empirical	Industry specific (high technology services)	Three information related attributes of the NSD process were investigated: Information gathering, diffusion and use. For gathering, the following areas were investigated: technology, <i>competition</i> (negative) and customer. Non-significant or negatively related findings are in italics	Organizational factors were added to the information factor of the process. These were: informal communication, innovative climate, <i>experience</i> and updating (of knowledge). Non-significant in italics.		NSD success was measured as multi item measure of three dimensions: Long-term success, short-term success and indirect success
Verganti and Buganza, 2005	Article, internet-based services	Empirical (two case studies)	Industry specific (online newspaper	Suggests rapid incremental innovations should		Investigates innovation types of rapid	

Leiponen, 2006	Article, business-to-business services	Empirical	Industry specific (business services)	be presupposed when designing first generation service offering.	Focuses types of knowledge resources as drivers of service innovation. All forms of knowledge except individual tacit knowledge positively related to service innovation	incremental innovations typical of online services. Studies differences in determinants of new service introductions versus incremental service improvements	
Kamiouchina, Victorino and Verma, 2006	Article, service innovation	Non-empirical, conceptual	General		Reviews the results of a survey on a conference identifying future research topics in service innovation from an integrated service marketing and operations management perspective. Not relevant to this review.		
Kelly and Storey, 2000	Article, new service development	Empirical	General	Descriptive study of formal NSD strategy, idea generation and generation. Three categories proposed:			Satisfaction with NSD approach was measured, but no analysis of relationships.

Blazevic, Lievens, and Klein, 2003	Article, new mobile service development	Empirical (four case studies as in Van Riel and Lievens, 2004, but actually mostly discussed))	Industry specific (telecom)	Prospector, analyzed, defender/reactor. Found little formal NSD strategy, little contact staff involvement. More details in descriptive tables. Investigates antecedents of effective NSD processes. Suggest model framework including decision architecture, team memory, information awareness, information processing capabilities, nature of communication, project complexity, management support, supplier information power and technology synergy to influence outcomes of NSD process.			NSD project learning and time to market investigated as outcomes, see also vanRiel and Lievens, 2004
van Riel and Lievens, 2004	Article, new service development	Empirical (four case studies)	Industry specific (telecom)	Investigates antecedents of effective NSD processes as a decision making process. Suggest cognitive style, attitudes and			NSD decision making effectiveness investigated as outcome. Two failed and two successful projects were

				knowledge of interfaces to customers, technology and rest of the firm and innovation project managers to be important.			studied.
Matear, Gray and Garrett, 2004	Article, new service development	Empirical	General		Market orientation, NSD capabilities and brand investment determinants of 4 comparative advantages affecting firm performance. Market orientation and NSD capabilities determine NSD success. Only parts of model supported. NSD success only affected by NSD capabilities. Path model on p. 294.	Firm performance as a result of cost effectiveness, brand, relationship and NSD success.	
Matthing, Sandén and Edvardsson, 2004	Article, new service development	Empirical	Industry specific (telecom)	Customer involvement studies by a 12 day experimental session with debriefing and workshop. Ideas from customers involved valued more innovative than those of			

Shulver, 2005	Article, new service design	Empirical (five cases)	General (cases from diverse service industries)	service developers by three of four evaluation panels Views NSD in light of two risks of loss, lack of attention to internal capabilities and lack of attention to market requirements. Cases believed to represents changes along these two risks. This leads to a more nuanced understanding of innovation types			Focus on risks and loss categories reveal “reparative NSD” as an alternative innovation type from traditional “speculative NSD”. A second categorization is contingent versus emergent innovation types which is more subtle to understand.	
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## Appendix C. Normative contributions

Reference	Outlet	Classification 1	Process	Driver	Type	Performance	Architecture
Lan, 2004	Article	Conceptual, review, general	Suggests the use of open innovation principles with online tools to facilitate the innovation process.		Mainly relevant to innovations with a major digital component.		Reviews the concept of e-innovation as a generalization of open source innovation architectures that is similar to open innovation but more focused on the online component.
Levy, 2005	Article	Conceptual, telecom			Suggests a methodology for decomposition as a basis for service innovations. Mainly incremental innovations.		
Berkhout and van der Duin, 2006	Working paper	Conceptual, telecom	Suggest replacing stage gate process models by a cyclical innovation model both for descriptive and normative purposes.		Cyclical innovation model used to illustrate the multitude of innovation types involved, including business model innovations and incremental service innovations.		Cyclical innovation model may be considered an innovation architecture more than a process or explanatory model.
Phaal, Farrukh and Probert,	Article	Conceptual, general	Presents the principles of		Technology roadmapping		

2004			technology roadmapping as a methodology.		applies to several innovation types, but two applications (incremental) – market pull and /radical) – technology push are presented.	
Van Halen, Vezzoli and Wimmer, 2005	Book	Conceptual, general	Proposes a methodology product service system innovation. This applies the principles of introducing environmental friendly PSS's. The model is a traditional stage gate process model.		PSS are innovations that are believed to be more sustainable than traditional product innovations.	Outcome focuses sustainability.
						Within the framework of the process model, tools and methods are suggested and supported.
Riederer, Baier and Graefe, 2005	Report	Conceptual, general	Textbook type report with stage gate model	Textbook type general drivers	Textbook type innovation types	Textbook type performance measures
						Traditional architecture, but tries to establish best practice examples by 6 cases.
Tidd and Hull, 2003	Article	Empirical, general		Contingency theory approach to relationship between organizational design and performance. Identifies best practices		Performance measures vary across organizational designs.
Neu and Brown,	Article	Empirical,		Applies a combined		

2005		general		contingency theory and resource based theory approach. Identifies success factors, but no normative framework is designed.				
Bragge, Martiin and Tuunanen, 2005	Conference paper	Conceptual, software industry	Some process elements in the Balloon Process Framework that is proposed. Three process elements: Establish community, gate lead users, involve lead users				Mainly suggests an architecture for service innovation based on a combination of internal knowledge and open online communities, like in e-innovation	
Falk et al., 2006	Conference paper	Conceptual, software industry	Suggest a process model for service development inspired by traditional NSD. Normative with respect to stage gate model, not tools.			Suggests structuring service innovations by cataloguing and bundling		
Oke, 2001	Article	Conceptual and empirical through case study, financial services (insurance)	Describes innovation process initiatives at the firm level (mad house). Including tools applied.	Describes initiatives to stimulate the development of an innovative climate (taskmasters + innovation corridor)	Suggests four innovation types and distribution of them; re-use, improve, create and eliminate.		Presents systematic steps to improve innovation capabilities at the firm level. Steps involve strategy, culture, actions/initiatives	

Wells et al., 2004	Article	Conceptual and empirical through case, postal service	Describes and exemplifies technology roadmapping in a service firm. Also suggests simple process for TRM.				/ processes and support structures.
Holmlid, 2004	Conference paper	Conceptual, software industry	Describes how NSD tools may be applied in IS service design. Suggests blueprinting and touch points/evidence techniques as two tools.				
Larson, Nyström and Pålsson	Master thesis	Empirical, case study at Alfa Laval (business services)	Describes and suggests a modified NPD process model for NSD at Alfa Laval – Stage gate model. Discusses flowcharting, blueprinting and critical incident tools as important	A few determinants are discussed in one of the chapters, but focus is on normative process.			
Moura a Sa and Saraiva, 2001	Article	Empirical, case study of public services	Applies QFD tools to the design of services in a kindergarten.		Focuses incremental innovations through quality improvement.		

Alonso-Rasgado, Thompson and Dannemark, 2004	Report	Conceptual, review, General	House of Quality tools also illustrated. Suggests a three stage linear process model simplified from NPD including concept development, system design and testing / implementation. Tools are suggested for each stage including QFD and blueprinting.					
Bullinger, Fährlich and Meiren, 2003	Article	Conceptual, general	Different NSD process models and tools recommended for four types of services. Three model types are also reviewed (waterfall, spiral and prototyping) as well as differences in process models for continuous versus temporary NSD processes.		Service typology is proposed, but this is not an innovation typology as such.		Suggests a service typology as a framework for diversification in NSD process models and tools. Service typology includes contact intensity (h/l) and variety (h/l).	
Stevens and Dimitriadis, 2005	Article	Empirical, two case studies, retail and financial services	Replaces a descriptive process model with a model describing actors,				Results from the two cases are integrated into an NSD architecture model, but this is	

Chai, Zhang and Tan, 2005	Article	Mainly conceptual, two case studies, general, tourism and educational services	decision making process and changes. The decision making process model is cyclical Suggests formal procedure for service innovations based on TRIZ. Partly validated in two case studies. TRIZ method adds tools and techniques to structure process.		TRIZ method identifies particular innovation types (40 principles and 76 standard solutions). TRIZ methods are problem oriented indicating an incremental type of innovation is focused.	TRIZ method provides a framework for problem solving with an innovation approach. This study makes partial use of the framework	not tested and it is now explicitly clear if it is descriptive or normative.
Meyer and DeTore, 1999	Article	Mainly conceptual, one case, healthcare	Stage gate model proposed. The framework is partly descriptive, partly normative.		Suggest service innovations from creating components and shows through a case how these may be combined to create new services. No methodology as such, mainly principles and an example. Illustrative figures may be applied as method.	Some of the framework that is suggested may be considered parts of an innovation architecture, but are mostly individual ideas for tools focusing decomposition and service innovations from decomposition and platform development.	
Bitran and Pedrosa, 1998	Article	Conceptual	Discusses the modifications of a NPD stage gate	Determinants outside the modified NPD		Generally suggests that NPD models	

Berry and Lampo, 2000	Article	Conceptual, general	model to fit NSD. Component design also included in their MPD model.	process are also discussed.		Suggest five service innovation types that may be obtained by service redesign. No specific service redesign methodology proposed.		provide sufficient methodologies to collectively be applied as an architecture for service innovation.
Berry et al., 2006	Article	Conceptual, general		Suggest some general drivers of service innovations but no methodology of how to utilize or obtain these drivers/success factors.		Suggests a service innovation typology based on innovation types along two dimensions; separability and type of benefit.		